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GOVERNMENT REPORTS

Announcements & Index

THE UNIVERSITY OF MICHIGAN
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Information Service

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GOVERNMENT REPORTS

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NATIONAL TECHNICAL INFORMATION SERVICE Melvin S. Day, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 10 May 9, 1980

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rrangement Of Citations

ibliographic entries in this journal are arranged by COSATI* assification. This scheme uses 22 broad subject categories which re further separated into 178 subcategories. A bibliographic ecord is listed in one subcategory only. There are no cross eferences except in the indexes. Within a subcategory, entries are sted alphanumerically by the NTIS order number.

ccess Points

here are several ways to determine where a particular topic or itation is in GRA&I. The titles of the broad subject categories are listed on the back cover with an edge index to the journal location. Also, subject category and subcategory titles are used as running heads on each page of the Reports Announcement section of the journal. Specific citations can be located by searching the indexes by keyword, personal author name, corporate author name, contract number, grant number, report number or NTIS order number. The page number of the main entry in the Reports Announcement section is given with each index entry.

*Committee on Scientific and Technical Information

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NTIS

You can use the Edge Index on the outside back cover to locate the beginning of each category within the Reports Announcements section.

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Subcategories: Aerodynamics; Aeronatuics; Aircraft; Aircraft Flight Control and Instrumentation; Air Facilities.

Category 2. Agriculture

Subcategories:Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

Category 3. Astronomy and Astrophysics

Subcategories: Astronomy; Astrophysics; Celestial Mechanics.

Category 4. Atmoshpheric Sciences

Subcategories: Atmospheric Physics; Meteorology.

Category 5. Behavioral and Social Sciences

Subcategories: Administration and Management; Documentation and Information Technology; Economics; History, Law and Political Science; Human Factors Engineering; Humanities; Linguistics; Man-machine Relations; Personnel Selection, Training and Evaluation; Psychology (Individual and Group Behavior); Sociology.

Category 6. Biological and Medical Sciences

Subcategories: Biochemistry; Bioengineering; Biology; Bionics; Clinical Medicine; Environmental Biology; Escape, Rescue, and Survival; Food, Hygiene, and Sanitiation; Industrial (Occupational) Medicine; Life Support; Medical and Hospital Equipment; Microbiology; Personnel Selection and Maintenance (Medical); Pharmacology; Physiology; Protective Equipment; Radiobiology; Stress Physiology; Toxicology; Weapon Effects.

Category 7. Chemistry

Subcategories: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

Category 8. Earth Sciences and Oceanography

Subcategories: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

Category 9. Electronics and Electrical Engineering

Subcategories: Components; Computer; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

Category 10. Energy Conversion (Non-propulsive)

Subcategories: Conversion Techniques; Power Sources; Energy Storage.

Category 11. Materials

Subcategories: Adhesives and Seals; Ceramics, Refractories,and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

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Category 16. Missile Technology

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Category 17. Navigation, Communications, Detection, an Countermeasures

Subcategories: Acoustic Detection; Communications; Direction Finding; Electromagnetic a Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigat and Guidance; Optical Detection; Radar Detection; Seismic Detection.

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Subcategories: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear strumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes a Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reac Physics; Reactors (Power); Reactors (Non-power); SNAP Technology.

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- Energy
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- Health Planning & Health Services Research
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SAMPLE ENTRIES

MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

PB-254 315/5GA PC **A16**/MF **A01**
Smithsonian Science Information Exchange, Inc., Washington, D.C.
Information on International Research and Development Activities in the Field of Energy, David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index.

Order number — **PB-254 315/5GA**
Corporate author — Smithsonian Science Information Exchange, Inc., Washington, D.C.
Personal author — David F. Hersey
Price codes — PC **A16**/MF **A01**
Report title — **Information on International Research and Development Activities in the Field of Energy,**
Abstract of report — This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index.

INDEX ENTRIES

Index entries are arranged alphanumerically. Titles are included in all indexes except the Contract Number index.

SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

Entries are sequenced by contract or grant number, corporate author, and NTIS order number.

ACCESSION/REPORT NUMBER

PB-254 315/5GI
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A PC **A16**/MF **A01**

Entries are sequenced by NTIS order, original report, or monitor agency number. Price codes are given in this index.

REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A079 694/6 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
Computation of Axisymmetric Separated Nozzle-Afterbody Flow.
Final rept. 1 Oct 77-30 Jul 79,
J. L. Jacocks. Jan 80, 31p Rept no. AEDC-TR-79-71
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The development of a computer program for solving the compressible, axisymmetric, mass-averaged Navier-Stokes equations is described. The basic numerical algorithm is the MacCormack explicit predictor-corrector scheme. Turbulence modeling is accomplished using an algebraic, two-layer eddy viscosity model with a novel modification dependent on the streamwise gradient of vorticity. Comparisons of computed results with experimental data are presented for several nozzle-afterbody configurations with either or simulated plumes. (Author)

AD-A079 794/4 PC **A04**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Determination dans les Installations au Sol des Parametres Aerodynamiques de Stabilite des Aeronefs (Determination in Ground Facilities of Aerodynamic Stability Parameters of Aircraft),
M. Scherer. Jun 79, 71p Rept no. AGARD-AG-242
Text in French; abstract in English.

No abstract available.

AD-A079 877/7 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Ground Plane Effects on a Contoured Surface at Low Subsonic Velocities.
Master's thesis,
Joseph A. Krawtz. Dec 79, 115p Rept no. AFIT/GA/AA/80M-3

The wing-in-ground effect phenomenon was examined by investigating the flow between a flat ground plate and a contoured upper plate. Velocity and turbulence intensity measurements were taken at various points in the flow with a Laser Doppler Velocimeter. Mach numbers studied were Mach 0.15 and Mach 0.2 at the exit plane of a 1 cm by 10 cm two-dimensional nozzle. Measurements were taken across the width of the jet, 5, 10, and 15 cm downstream with plate separations of 1, 2, and 5 cm and vertically without the ground plate. In addition measurements were taken near the top plate with conventional pressure measuring techniques and the results compared. The proximity of the ground plate had the effect of spreading the flow outward across the 10 cm width of the jet by 20%. The laser velocimeter showed the turbulence intensity to be constant across the potential core of the jet. Turbulence intensity increased beyond 10% in the boundary layers of the jet and in the plate boundary layer. The pressure measurement data correlated well with the laser velocimeter results.

AD-A079 927/0 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Computation of Supersonic Space Encircling Flow of Blunt-Nosed Body,
Zhu Youlan, Wang Ruquan, and Zhong Xichang . 21 Jun 79, 31p Rept no. FTD-ID(RS)-T-0645-79
Edited trans. of Li Hsueh (China) N4 p270-282 1977, by H. P. Lee.

No abstract available.

AD-A079 929/6 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Comparison of the Aerodynamic Properties of Aircraft with a Canard and a Conventional Arrangement,
Jan Staszek. 13 Jun 79, 25p Rept no. FTD-ID(RS)T-0730-79
Edited trans. of Prace Instytutu Lotnictwa (Poland) N63 p63-78 1975, by Thaddeus Szkoda.

No abstract available.

AD-A079 933/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Experimental Research on Flow Optimization in Low-Speed Wind Tunnels,
St. N. Savulescu, V. Toma, and Gh. Gh. Gheorghiu. 25 Jul 79, 24p Rept no. FTD-ID(RS)T-0880-79
Edited trans. of Studii Si Cercetari De Mecanica Aplicata, (Romania) v37 n2, p159-176, Mar-Apr 78.

No abstract available.

AD-A080 046/6 PC **A03**/MF **A01**
Mississippi State Univ Mississippi State Engineering Industrial Research Station
Three-Dimensional Laminar Solution of the Navier-Stokes Equations Using Body-Fitted Coordinate Systems. Part II.
Final rept.,
C. W. Mastin, J. F. Thompson, A. Ghosh, and T. H. Fu. 30 Nov 79, 27p MSSU-EIRS-ASE-79-2, AFOSR-TR-80-0084
Grant AFOSR-76-2922
See also AD-A080 093.

Numerical methods are developed for constructing body-fitted curvilinear coordinate systems for the region surrounding an arbitrary three-dimensional body. Finite difference schemes are investigated for solving the Navier-Stokes equations on body-fitted coordinates. Solutions are computed for flow about a sphere and a finite wing. (Author)

AD-A080 073/0 PC **A02**/MF **A01**
Martin Marietta Labs Baltimore MD
Computation of Three-Dimensional Aerodynamic Flow.
Final rept. 1 Jul 76-31 Jan 80,
K. C. Wang. Jan 80, 10p AFOSR-TR-80-0034
Contract F49620-76-C-0004
Continuation of Contract F44620-70-C-0085.

The present contract continues an earlier one which extended from 1970-1976, F44620-70-C-0085. The purpose of this continued action was to make pioneering calculations of genuine three-dimensional laminar boundary layers. During the current contract period, efforts were first focused on investigations of: (1) the general characteristics of three-dimensional flow separation, especially for aerospace applications and (2) the boundary layer features and the magnus forces on spinning bodies such as spinning projectiles or missiles. Later emphasis gradually shifted to the boundary layer over an aircraft wing in contrast to that around a body of revolution studied theretofore.

AD-A080 093/8 PC **A04**/MF **A01**
Mississippi State Univ Mississippi State Engineering Industrial Research Station
Numerical Solution of the Two-Dimensional Incompressible Averaged Navier-Stokes Equations for Finite Arbitrary Shaped Isolated Bodies. Part 1.
Final rept.,
Z. U. A. Warsi, B. B. Amlicke, and J. F. Thompson. Nov 79, 57p MSSU-EIRS-ASE-79-1, AFOSR-TR-80-0083
Grant AFOSR-76-2922
See also AD-A080 046.

Numerical solutions of the two-dimensional averaged Navier-Stokes equations for the prediction of laminar, transitional, and turbulent flow fields around finite bodies of arbitrary shapes have been considered. Numerically generated body-fitted curvilinear coordinates and the relevant metric terms are used to provide the finite-difference solutions of the Navier-Stokes and the equations of turbulent quantities. Complete flow fields, including the boundary layer parameters, are obtained by using the zero, one and two-equations models for Schubauer's elliptical section, NACA663-018 airfoil, and a circular cylinder at free stream Reynolds numbers of 159,000, 1.2 and 1.4 million per foot respectively. In addition, a two-equation model with an algebraic-stress closure has also been developed. (Author)

AD-B002 701/1 PC **A10**/MF **A01**
Bolt Beranek and Newman Inc Cambridge Mass
Aerodynamically Induced Pressure Oscillations in Cavities - Physical Mechanisms and Suppression Concepts.
Final rept. Apr 73-Nov 74,
Hanno H. Heller, and Donald B. Bliss. Feb 75, 224p BBN-2884, AFFDL-TR-74-133
Contract F33615-73-C-3075
Distribution limitation now removed.

This report presents the results of an analytical and experimental research program to (1)improve the understanding of the physical mechanisms that control the occurrence of pressure fluctuations in long and shallow rectangular cavities, exposed to high-speed external flow, and (2)devise and evaluate devices that would either substantially reduce the amplitude of such pressure fluctuations, or totally suppress the occurrence of pressure fluctuations. During this investigation, the understanding of the complex interaction of the external shear layer and the cavity internal fluid medium, which constitutes the generating mechanism of high-intensity periodic pressure fluctuations was substantially furthered. Both the analysis and investigation of the physical mechanisms were aided through extensive shallow-water flow-simulation experiments. Large-scale experiments, using the NASA-Lewis Research Center 8 X 6 ft Supersonic Wind Tunnel were conducted to substantiate some of the analytical predictions and to study in detail the aeroacoustic behavior of cavities in the length-to-depth ratio range, L/D, of 2.3 to 5.5, and the Mach number range of 0.8 to 2.0. Detailed information was obtained on the normalized levels of the first three resonant modes in the cavity for a range of cavity length-to-depth ratios and freestream Mach numbers. Several concepts for pressure oscillation suppression were developed and evaluated in wind tunnel experiments. The most promising concept utilizes a slanted trailing edge, which stabilizes the free shear flow above the cavity, thus effectively suppressing discrete-tone generation. (Author)

AD-B013 257/1 PC **A07**/MF **A01**
General Dynamics/Fort Worth Tex Fort Worth Div
Design, Fabrication, Testing and Analysis of Torsion Free Wing Trend Flutter Models.
Final rept. Apr 75-May 76,
A. C. Murphy, R. P. Peloubet, R. M. Bolding, and J. J. Hosek. May 76, 142p AFFDL-TR-76-40
Contract F33615-75-C-3045
Distribution limitation now removed.

Trend type aluminum plate flutter models of a Torsion Free Wing (or free floating wing) were designed, built and wind tunnel tested. Types of models tested included cantilever, torsion free wing with a forward trim surface and torsion free wing with an aft trim surface. Several flutter points were obtained in the wind tunnel. The models were also vibration tested and static deflection tested to measure influence coefficients. These measured data were then used in flutter and divergence analyses. The correlation between analysis results and wind tunnel results is good for some cases and fair or poor for others. Reasons for lack of correlation in some cases are given. (Author)

AD-B013 340/5 PC **A04**/MF **A01**
Auburn Univ Ala Dept of Aerospace Engineering
Mutual Aerodynamic Interference Effects for Multiple Bodies of Revolution and Distorted Bodies of Revolution.
Final rept. Jun 73-Sep 75,
Fred W. Martin, Grady Saunders, Jr., and Malcolm A. Cutchins. Apr 76, 57p AFATL-TR-76-47
Contract F08635-71-C-0090, F08635-75-C-0023
Distribution limitation now removed.

A method of solution for the aerodynamic flow field about two bodies at angle of attack including mutual interference effects has been devised for bodies with circular cross-section. The analytical method used is a modification of a method of solution for the flow about axisymmetric bodies in close proximity at zero angle of attack. As a demonstration of this method, the flows about one, two and three finless M-117 bomb shapes were investigated. Theoretical pressure distributions are presented for the two and three body cases. For the three body case, experimental data is available; however, there is poor agreement with data thought primarily to be because of flow separation along the

tails of the bombs. A non-axisymmetric modification of the M-117 bomb shape was developed in order to simulate the flow separation. The analytical results of this effort are compared with the experimental data. (Author)

N80-16023/7 PC **E02**
National Aeronautics and Space Administration, Washington, DC.
Aeronautical Engineering: A Continuing Bibliography, Supplement 116.
Dec 79, 166p NASA-SP-7037(116)

This bibliography lists 550 reports, articles, and other documents introduced into the NASA scientific and technical information system in November 1979.

N80-16031/0 PC **A06**/MF **A01**
Vought Corp., Dallas, TX.
Application of Numerical Optimization to the Design of Wings with Specified Pressure Distributions.
Final Report.
H. P. Haney, and R. R. Johnson. Feb 80, 108p NASA-CR-3238
Contract NAS2-9653

A practical procedure for the optimum design of transonic wings is demonstrated. The procedure uses an optimization program based on the method of feasible directions coupled with an aerodynamic analysis program which solves the three-dimensional potential equation for subsonic through transonic flow. Two new wings for the A-7 aircraft were designed by using the optimization procedure to achieve specified surface pressure distributions. The new wings, along with the existing A-7 wing, were tested in the Ames 11 ft transonic wind tunnel. The experimental data show that all of the performance goals were met. However, comparisons of the wind tunnel results with the theoretical predictions indicate some differences at conditions for which strong shock waves occur.

N80-16032/8 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Wind-Tunnel/Flight Correlation Study of Aerodynamic Characteristics of a Large Flexible Supersonic Cruise Airplane (Xb-701) 2: Extrapolation of Wind-Tunnel Data to Full-Scale Conditions.
J. B. Peterson, Jr., M. J. Mann, R. B. Sorrells, Iii, W. C. Sawyer, and D. E. Fuller. Feb 80, 80p NASA-TP-1515, L-12688

The results of calculations necessary to extrapolate performance data on an XB-70-1 wind tunnel model to full scale at Mach numbers from 0.76 to 2.53 are presented. The extrapolation was part of a joint program to evaluate performance prediction techniques for large flexible supersonic airplanes similar to a supersonic transport. The extrapolation procedure included: interpolation of the wind tunnel data at the specific conditions of the flight test points; determination of the drag increments to be applied to the wind tunnel data, such as spillage drag, boundary layer trip drag, and skin friction increments; and estimates of the drag items not represented on the wind tunnel model, such as bypass doors, roughness, protuberances, and leakage drag. In addition, estimates of the effects of flexibility of the airplane were determined.

N80-16033/6 PC **A05**/MF **A01**
McDonnell-Douglas Corp., St. Louis, MO.
Development of Panel Methods for Subsonic Analysis and Design.
Final Report.
D. R. Bristow. Feb 80, 84p NASA-CR-3234
Contract NAS1-15369

Two computer programs, developed for subsonic inviscid analysis and design are described. The first solves arbitrary mixed analysis design problems for multielement airfoils in two dimensional flow. The second calculates the pressure distribution for arbitrary lifting or nonlifting three dimensional configurations. In each program, inviscid flow is modelled by using distributed source doublet singularities on configuration surface panels. Numerical formulations and representative solutions are presented for the programs.

N80-16035/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Wing Flapping with Minimum Energy.
R. T. Jones. Jan 80, 18p NASA-TM-81174, A-8076

For slow flapping motions it is found that the minimum energy loss occurs when the vortex wake moves as a rigid surface that rotates about the wing root - a condition analogous to that determined for a slow-turning propeller. The optimum circulation distribution determined by this condition differs from the elliptic distribution, showing a greater concentration of lift toward the tips. It appears that very high propulsive efficiencies are obtained by flapping.

N80-16036/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
A Comparison of Calculated and Experimental Lift and Pressure Distributions for Several Helicopter Rotor Sections.
J. Conlon. Jan 80, 33p NASA-TM-81160, A-8029

The use of computational techniques in predicting lift coefficients and pressure distributions of two dimenstional airfoil sections was studied. The computer code FL06/IBL was used to solve the compressible, two dimensional flow about four different airfoil sections. The lift coefficients of the airfoils were calculated at various angles of attack at subsonic Mach numbers and compared with experimental data.

N80-16294/4 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Effect of Streamwise Vortices on Tollmein-Schlichting Waves.
A. H. Nayfeh. Mar 79, 20p NASA-CR-162654, VPI-E-79.12
Grant NSG-1255, Contract N00014-75-C-0381

The method of multiple scales is used to determine a first order uniform expansion for the effect of counter rotating steady streamwise vortices in growing boundary layers on Tollmien-Schlichting waves. The results show that such vortices have a strong tendency to amplify three dimensional Tollmien-Schlichting waves having a spanwise wavelength that is twice the wavelength of the vortices. An analytical expression is derived for the growth rates of these waves. These growth rates increase linearly with increasing amplitudes of the vortices.

N80-16296/9 PC **A03**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Mechanical Engineering and Mechanics.
Nonparallel Stability of Three-Dimensional Compressible Boundary Layers. Part 1: Stability Analysis.
Final Report.
N. M. El-hady. Feb 80, 38p NASA-CR-3245
Grant NSG-1645

A compressible linear stability theory is presented for nonparallel three-dimensional boundary-layer flows, taking into account the normal velocity component as well as the streamwise and spanwise variations of the basic flow. The method of multiple scales is used to account for the nonparallelism of the basic flow, and equations are derived for the spatial evolution of the disturbance amplitude and wavenumber. The numerical procedure for obtaining the solution of the nonparallel problem is outlined.

N80-16297/7 PC **A02**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
Analytical and Design Techniques for Drag Reduction Studies on Wavy Surfaces.
Final Report.
R. Balasubramanian. Jan 80, 22p NASA-CR-3225
Contract NAS1-15278

Numerical models for two dimensional turbulent boundary layers over wavy surfaces were investigated. Computations for wavy wall boundary layers indicate possibilities of overall drag reduction in a parameter range of the geometry of the wall. The correction technique using integral methods for analyzing arbitrary surfaces was found to be unsuitable for some cases of interest in drag reduction; a Navier-Stokes solver for wavy walls was built to test these problems. Test results of the Navier-Stokes solver indicate that the solution techniques are accurate enough to handle complex geometries and steep variations in fluid properties.

PB80-805666 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aircraft Wake Vortices (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Guy E. Habercom. Jr. Mar 80, 288p
Supersedes NTIS/PS-79/0166, NTIS/PS-78/0122, and NTIS/PS-77/0067.

Wake vortices and turbulent flow across aircraft lifting surfaces are investigated in the Government-sponsored research documents. Aerodynamic characteristics of vortices are reviewed with special attention made to trailing aircraft and aviation safety. (This updated bibliography contains 281 abstracts, 23 of which are new entries to the previous edition.)

1B. Aeronautics

AD-A079 803/3 PC **A17**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
EASY ACLS Dynamic Analysis. Volume II. Part II. Component Computer Programs.
Final rept. Apr 77-Jun 79,
M. K. Wahi, G. S. Duleba, and P. R. Perkins. Sep 79, 395p AFFDL-TR-79-3105-VOL-2-PT-2
Contract F33615-77-C-3054

This volume contains a detailed description of the component subroutines and of other standard functions/subroutines which are used in the EASY dynamic analysis program. Macro-flow charts and some micro-flowcharts and listings are included. Sample output is included where appropriate. (Author)

AD-A079 851/2 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Minimum Time Turns with Thrust Reversal.
Master's thesis,
Thomas L. Johnson. Dec 79, 77p Rept no. AFIT/GAE/AA/79D-6

The object of this study is to find the optimal trajectories and corresponding minimum turning times for a high performance aircraft with and without thrust reversal to perform a prescribed turn, and then to compare those trajectories and times to evaluate the benefit of thrust reversal. Optimal control theory is applied to solve the minimum time to turn optimal control problem, using a suboptimal control problem approach and a second-order parameter-optimization method. The results of the study found that the suboptimal control approach was effective in solving the problem, that thrust reversal is beneficial in reducing turning time if the aircraft's initial velocity is above the corner velocity, and that thrust reversal is not beneficial in performing a minimum time turn without losing energy. (Author)

AD-A079 865/2 PC **A05**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 75. C-141A Aircraft, Near and Far-Field Noise.
Technical rept.,
Robert G. Powell. Jul 79, 85p Rept no. AMRL-TR-75-50-VOL-75
See also Volume 1, AD-A031 865 and Volume 76, AD-A053 706.

The USAF C-141A is a transport aircraft powered by four TF33-P-7 turbofan engines. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating on a concrete runup pad for three power conditions. Near-field data are reported for ten locations in a wide variety of physical and psycho-

coustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 871/0 PC **A05**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 133. F-15 Aircraft In the AF32A-23 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Jul 79, 89p Rept no. AMRL-TR-75-50-VOL-133
See also Volume 1, AD-A031 865 and Volume 134, AD-A079 872.

The AF32A-23 noise suppressor is made by the Jetway Equipment Corporation for acoustical suppression of the F-15 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for four engine power configurations. Near-field data are reported for locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interferences level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 16 locations are normalized to standard meterological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 872/8 PC **A04**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 134. KC-135A Aircraft In the Modified AF32A-52A Noise Suppressor, Far-Field Noise.
Technical rept.,
Robert A. Lee. Mar 79, 75p Rept no. AMRL-TR-75-50-VOL-134
See also Volume 1, AD-A031 865 and Volume 135, AD-A079 873.

The AF32A-52A noise suppressor was made by Industrial Acoustics Corporation and modified by the Air Force for acoustical suppression of the KC-135A aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in an AF32A-52A suppressor for three engine power configurations. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for seven acoustic measures as functions of angle and distance from the source.

AD-A079 873/6 PC **A06**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 135. F-106 Aircraft In the AF32A-17 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Nov 78, 104p Rept no. AMRL-TR-75-50-VOL-135
See also Volume 1, AD-A031 865 and Volume 136, AD-A079 874.

The AF32A-17 noise suppressor is made by Jetway Equipment Corporation for acoustical suppression of the F-106 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for five engine power configurations. Near-field data are reported for two locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meterological conditions and extrapolated from 75-8000 meters to derived sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 874/4 PC **A05**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 136. F-111A Aircraft In the AF32A-13 Noise Suppressor, Far-Field Noise.
Technical rept.,
Robert A. Lee. Mar 79, 100p Rept no. AMRL-TR-75-50-VOL-136
See also Volume 1, AD-A031 865 and Volume 137, AD-A073 617.

The AF32A-13 noise suppressor is made by the Industrial Acoustics Corporation for acoustical suppression of the F-111A aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in the AF32A-13 noise suppressor for five power conditions. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for seven acoustic measures as functions of angle and distance from the source.

AD-A079 875/1 PC **A05**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 140. F-16 Aircraft In the AF32A-25 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Aug 79, 87p Rept no. AMRL-TR-75-50-VOL-140
See also Volume 1, AD-A031 865 and Volume 138, AD-A073 618.

The AF-32A-25 noise suppressor is made by the Jetway Equipment Corporation for acoustical suppression of the F-16 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for four engine power configurations. Near-field data are reported for three locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meterological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 911/4 PC **A07**/MF **A01**
Systems Technology Inc Hawthorne CA
Development of VTOL Flying Qualities Criteria for Low Speed and Hover.
Final rept.,
Roger H. Hoh, and Irving L. Ashkenas. Dec 79, 146p STI-TR-1116-1, NADC-77052-30
Contract N62269-77-C-0278

A classification scheme has been developed to account for outside visual cues and cockpit displays in determining the required equivalent system forms for low speed and hover. Tentative criteria are presented in terms of a visibility scale which quantifies environmental conditions for the intended mission in a more fine-grained manner than simply specifying IMC or VMC. There are indications that rate and attitude systems may be used for partial IMC conditions but that a translational rate command system is required for low speed and hover in zero visibility. In general, most experiments indicate that advanced displays are not a substitute for augmentation. Tentative limiting conditions are defined for rate and attitude systems, but more data are required to define handling qualities for translational rate command systems. Since the existing data base is primarily oriented toward command/response characteristics, definition of the limiting conditions for turbulence and large discrete wind shears also requires more data. (Author)

AD-A079 915/5 PC **A12**/MF **A01**
Army Safety Center Fort Rucker AL
3W Analysis of FY 78 Army Aircraft Accidents.
Technical rept.,
G. Dwight Lindsey, and William R. Brown. May 79, 266p Rept no. USASC-TR-79-3

Army aircraft accident data for FY 78 were analyzed. The major accident cause factors (hazards) were identified and ranked according to the magnitude of their effect and probability of occurrence. Prevention requirements based on the hazard analysis are discussed. (Author)

N80-16071/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Design Considerations for Attaining 200-Knot Test Velocities at the Aircraft Landing Loads and Traction Facility.
G. L. Giles, and S. M. Stubbs. May 79, 75p NASA-TM-80096

Design studies are presented which consider the important parameters in providing 200 knot test velocities at the landing loads and traction facility. Two major components of this facility, the hydraulic jet catapult and the test carriage structure, are considered. Suitable factors are determined to correlate analytical data for characteristics of the hydraulic jet catapult with data measured from the existing catapult system. The resulting equations are used to calculate test velocities for a range of jet nozzle diameters and carriage masses with both the current 122 m and an increased 183 m catapult stroke. Using the catapult characteristics, a target design point is selected and a carriage structure is sized to meet the target point strength requirements.

N80-16839/6 PC **A05**/MF **A01**
Systems Research Labs., Inc., Newport News, VA. RADA Div.
Experimental Evaluation of Active and Passive Means of Alleviating Rotor Impulsive Noise in Descent Flight.
D. S. Janakiram. Nov 79, 86p NASA-CR-159188, RASA/SRL-14-79-04
Contract NAS1-15337

A controlled wind tunnel test program was conducted on a model 2.14 m (7 ft) diameter teetering rotor to determine the effectiveness of blade tips such as the Ogee tip and the TAMI (Tip Air Mass Injection) tip in reducing the impulsive noise due to blade-vortex interaction in descent flight. In addition, a full rectangular tip which has the same span as the Ogee tip and an effective rectangular tip which has the same lifting area as the Ogee tip were also considered. The tests were conducted at two advance ratios (0.125 and 0.14) with various descent rates ranging from steady level flight to about 6 m/sec (20 ft/sec). A comparison of the performance of different rotors showed that for the same tip Mach number and thrust, the Ogee tip rotor absorbed more power than the full rectangular tip rotor, while the TAMI tip rotor absorbed more power than the effective tip rotor.

PB80-138407 PC **A09**/MF **A01**
Civil Aeronautics Board, Washington, DC. Office of Comptroller.
Handbook of Airline Statistics. Supplement - Calendar Years 1977 and 1978.
Final rept. 1977-78,
Paul Gavel. Dec 79, 195p CAB-OC-79-01
See also report for 1975 and 1976, PB-275 156.

This updated reference volume of 188 pages includes a wide variety of annual traffic, profit and loss, and balance sheet data for each United States Certificated Air Carrier for 1977 and 1978. Other sections include chronologies of significant events effecting aviation, growth of the airline industry, miscellaneous air transport data, comparisons of air with other modes of transportation as well as carrier group data. It also contains information involving classes of air carriers other than the Certificated Air Carriers.

1C. Aircraft

AD-A079 548/4 PC **A05**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ

Postcrash Fuel Fire Hazard Measurements in a Wide-Body Aircraft Cabin.
Final rept. Mar 77-Dec 78,
Richard G. Hill, George R. Johnson, and Constantine P. Sarkos. Dec 79, 92p Rept no. FAA-NA-79-42

This report describes results obtained utilizing a full-scale, wide-body test article for studying postcrash cabin fire hazards produced by an external fuel fire adjacent to a cabin door opening. Seventy-two tests were conducted at various ambient wind conditions and fire sizes in a fire-hardened cabin devoid of interior materials. This work was the first phase of a study to realistically characterize postcrash cabin fire hazards. Temporal data, taken at a large number of cabin locations, are presented and discussed pertaining to the effect of ambient wind on the rate of hazard accumulation inside of the cabin; stratification of heat, smoke, and toxic gases; the effect of fire size of thermal radiation through the opening; and the relative importance of heat, smoke, and carbon monoxide in a fuel-dominant fire. It is concluded that major stratification of hazards occurs in the cabin when the hazards are created by an external fuel fire, and that ambient wind determines the amount of hazards entering a cabin due to a given external fuel fire. (Author)

AD-A079 631/8 PC **A17**/MF **A01**
Bell Helicopter Textron Fort Worth TX
Rotorcraft Flight Simulation, Computer Program C81. Volume I. Engineer's Manual.
Final rept. Nov 76-Aug 77,
James R. Van Gaasbeek, T. T. McLarty, and S. G. Sadler. Oct 79, 392p BHT-699-099-062-VOL-1, USARTL-TR-77-54A
Contract DAAJ02-77-C-0003
Supersedes Rept. no. USAAMRDL-TR-76-41A, AD-A042 462. See also Volume 2, AD-A079 632.

This report consists of three volumes and documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAJ77. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAMO5, and the rotor wake program is called AR9102. The first volume, the Engineer's Manual, presents an overview of the computer program capabilities plus discussions for the background and development of the principal mathematical models in the program. The models discussed include all those currently in the program.

AD-A079 632/6 PC **A22**/MF **A01**
Bell Helicopter Textron Fort Worth TX
Rotorcraft Flight Simulation, Computer Program C81. Volume II. User's Manual.
Final rept. Nov 76-Aug 77,
James R. Van Gaasbeek. Oct 79, 511p BHT-699-099-062-VOL-2, USARTL-TR-77-54B
Contract DAAJ02-77-C-0003
Supersedes Rept. no. USAAMRDL-TR-41B, AD-A042 908. See also Volume 3, AD-A077 345.

This report consists of three volumes and documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAJ77. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAMO5, and the rotor wake program is called AR9102. Volume II, the User's Manual, contains the detailed information necessary for setting up an input data deck and interpreting the computed data. Volume III, the Programmer's Manual, includes a catalog of subroutines and a discussion of programming considerations. The source tapes and related software for the computer programs documented in this report are unpublished data on file at the Applied Technology Laboratory, U.S. Army Research and Technology Laboratories (AVRADCOM), Fort Eustis, Virginia.

AD-A079 746/4 PC **A11**/MF **A01**
Air Force Aero Propulsion Lab Wright-Patterson AFB OH
An Analytical and Experimental Study of Aircraft Hydraulic Lines Including the Effect of Mean Flow.
Final rept. Jul 77-Jul 79,
John H. Pletcher, Jr. Nov 79, 234p Rept no. AFAPL-TR-79-2104

A mathematical model of a fluid transmission line was developed which included the effect of mean flow coupling with oscillatory flow. The analysis centered on solving the nonhomogeneous confluent hypergeometric equation with complex parameters using an infinite series and evaluating the solution using Ward's method. Experiments were run using an aircraft hydraulic system. The frequency response, vibration displacement, and standing pressure half wave were measured in a straight line and a line with bends for flow rates up to 9.5 gpm. A clampon transducer, which did not disturb the flow and could be easily moved, was used for the pressure measurements. In the absence of vibration the clampon transducer measurements were within 5% of readings taken with a conventional Statham in-line transducer. A sensitivity analysis showed the effect of small changes in geometry, temperature, steady-state pressure, fluid properties, entrained air content, and element volume. Using the new mathematical model, the attenuation and phase constant were calculated for hydraulic and air lines. Results compared well with experiment and published data. The new analysis and line model provide a means for the fluid systems engineer to accurately account for mean flow effects. (Author)

AD-A079 852/0 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Thrust Vectoring to Eliminate the Vertical Stabilizer.
Master's thesis,
Roy Edward La Froth. Dec 79, 134p Rept no. AFIT/GAE/AA/79D-9

Root locus analysis techniques are used to design an active thrust vector control system to provide the directional stability for an F-111 without the vertical stabilizer. A linear analysis of the lateral-directional modes is performed for the aircraft both with and without the vertical stabilizer. The aircraft with the vertical stabilizer is used as a baseline. Computer histories for discrete atmospheric turbulence and a covariance analysis for random turbulence are used for the evaluation. It is found that the thrust vector control produces a response as good as or better than the baseline aircraft. Requirements for the thrust vector deflection and rate of deflection are generated. The lowest possible rate of deflection for acceptable flying qualities is shown to be 1 rad/sec. (Author)

AD-A079 856/1 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
The Prediction of Mass Loaded Natural Frequencies and Forced Response of Complex, Rib-Stiffened Structures.
Master's thesis,
Larry Blake Glenesk. Dec 79, 149p Rept no. AFIT/GAE/AA/79D-5

An experimental investigation was conducted to determine the validity of an algorithm developed by Whaley (Ref 14) to approximate the natural frequencies of a complex structure under arbitrary mass loading conditions, when only the unloaded natural frequency and mode shape data is known. The chosen test specimen was a curved, rib-stiffened panel from a C-141 Starlifter, aircraft. The panel was suspended from the ceiling by bungy cords and tested in an unloaded configuration and nine separate mass loaded configurations. Then using only unloaded data the generalized mass and generalized stiffness for each mass loaded configuration were computed, and the natural frequencies for each configuration were computationally predicted using the aforementioned algorithm. The theoretical and experimental results were then compared to detemine the amount of error incurred in the approximation technique. The theory of how to ultimately determine the overall forced response of the specimen was discussed and an error model was developed to enable an examination of the reliability of the algorithm in predicting forced response. Recommendations concerning future test procedures, areas requiring further study, and the use of the algorithm were made. (Author)

AD-A079 866/0 PC **A07**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 120. C-5A Aircraft, Near and Far-Field Noise.
Technical rept.,
Robert G. Powell. Jul 79, 143p Rept no. AMRL-TR-75-50-VOL-120
See also Volume 121, AD-A079 867 and Volume 1, AD-A031 865.

The USAF C-5A is a global, strategic airlift aircraft powered by four TF39-GE-1 turbofan engines. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating on a concrete runup pad for five engine/power configurations. Near-field data are reported for forty-five locations in a wide variety of physical and psychoacoustic measures: overall and band sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 867/8 PC **A08**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 121. F-4C Aircraft, Near and Far-Field Noise.
Technical rept.,
Robert G. Powell. Apr 79, 153p Rept no. AMRL-TR-75-50-VOL-121
See also Volume 125, AD-A073 616 and Volume 1, AD-A031 865.

The USAF F-4C is an all-weather, supersonic, fighter-bomber aircraft powered by two J79-GE-15 turbojet engines. This report provides measured by and extrapolated data defining the bioacoustic environments produced by this aircraft operating on a concrete runup pad for six engine/power configurations. Near-field data are reported for six locations in a wide variety of physical and phychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-Field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distances from the source.

AD-A079 868/6 PC **A06**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 128. T-38 Aircraft in the AF32A-18 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Jul 79, 105p Rept no. AMRL-TR-75-50-VOL-128
See also Volume 129, AD-A073 793 and Volume 1, AD-A031 865.

The AF32A-18 noise suppressor is made by General Acoustics Corporation for acoustical suppression of the T-38 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for five engine power configurations. Near-field data are reported for four locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 869/4 PC **A04**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 131. F-4 Aircraft In the AF32A-14 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Feb 79, 69p Rept no. AMRL-TR-75-50-VOL-131
See also Volume 132, AD-A079 870 and Volume 1, AD-A031 865.

The AF32A-14 noise suppressor is made by Koppers Environmental Elements Corporation for acoustical suppression of the F-4 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for three engine power configurations. Near-field data are reported for two locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 870/2 PC **A04**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 132. F-5 Aircraft In the AF32A-18 Noise Suppressor, Near and Far-Field Noise.
Technical rept.,
Robert A. Lee. Mar 79, 69p Rept no. AMRL-TR-75-50-VOL-132
See also Volume 133, AD-A079 871 and Volume 1, AD-A031 865.

The AF32A-18 noise suppressor is made by the General Acoustics Corporation for acoustical suppression of the F-5 aircraft. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating in this suppressor for three engine power configurations. Near-field data are reported for two locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source.

AD-A079 923/9 PC **A13**/MF **A01**
Dynamics Research Corp Wilmington MA Systems Div
Application of the Estimation-Before-Modeling (EBM) System Identification Method to the High Angle of Attack/Sideslip Flight of the T-2C Jet Trainer Aircraft. Volume II. Simulation Study Using T-2C Wind Tunnel Model Data.
Final rept.,
Harold L. Stalford, and S. Ramachandran. 23 Jun 78, 288p R-254U, 1273-VOL-2, NADC-76097-30-VOL-2
Contract N62269-76-C-0342
See also Volume 3, AD-A079 924.

This report presents the results of a feasibility study of the Estimation-Before-Modeling (EBM) method for aerodynamic parameter identification in the stall/post stall flight regimes. The feasibility study is conducted by processing synthetic flight data generated by exciting a wind tunnel model of the Navy's T-2C, a light jet trainer aircraft. It is carried out under realistic conditions by using the controls and the initial conditions of sixteen actual T-2C flight test data records to generate the sixteen synthetic maneuvers used in the study. The synthetic data are corrupted by realistic measurement noise levels representative of the actual. The EBM method is a two stage process. In the first stage, the corrupted data are processed one maneuver at a time using an extended Kalman-Bucy filter/Bryson-Frazier smoother to obtain estimated values of the states and of the forces and moments acting on the aircraft. In the second stage, subspace modeling together with a step-wise multiple linear regression technique is used to process the estimated values from all sixteen maneuvers together in parallel to identify a global state/control dependent model of the three force coefficients and the three moment coefficients. The identified global model compares well with the true values of the T-2C wind tunnel model. The EBM method is demonstrated to accurately identify the high nonlinearities of the T-2C wind tunnel model. The prediction accuracy of the identified global model is shown to be excellent by a comparison of the responses for a new maneuver and for the original sixteen maneuvers. (Author)

AD-A079 924/7 PC **A12**/MF **A01**
Dynamics Research Corp Wilmington MA Systems Div
Application of the Estimation-Before-Modeling (EBM) System Identification Method to the High Angle of Attack/Sideslip Flight of the T-2C Jet Trainer Aircraft. Volume III. Identification of T-2C Aerodynamics Stability and Control Characteristics from Actual Flight Test Data.
Final rept.,
Harold L. Stalford. 11 Apr 79, 256p R-287U, 1273-VOL-3, NADC-76097-30-VOL-3
Contract N62269-76-C-0342
See also Volume 1, AD-A080 025.

This volume presents the results of the application of the Estimation-Before-Modeling (EBM) System Identification Method to high angle of attack/sideslip flight test data of the T-2C Jet Trainer aircraft. Eighteen maneuvers consisting of over 600 seconds of 20 hertz data are processed. An extended Kalman-Bucy filter/Bryson-Frazier smoother is used in the first step to provide state estimates and measurement biases and scale factors. In the second step of the EBM method, the stepwise multiple linear regression technique and subspace modeling are used to identify detailed models of C sub y, C sub l, C sub n and C sub m. Partial results are given for C sub x and C sub z. The state and control derivatives of the identified model agree well with the wind tunnel model. Most of the identified dynamic derivatives compare well with the theoretically predicted value at low alpha and some compare well at high alpha.

AD-A079 930/4 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Aircraft and Astronautic Engineering.
7 Jun 79, 29p Rept no. FTD-ID(RS)T-0732-79
Edited trans. of Technika Lotnicza i Astronautyczna (Poland) n10 p27-34 1974, by F. Zaleski.

No abstract available.

AD-A080 025/0 PC **A04**/MF **A01**
Dynamics Research Corp Wilmington MA Systems Div
Application of the Estimation-Before-Modeling (EBM) System Identification Method to the High Angle of Attack/Sideslip Flight of the T-2C Jet Trainer Aircraft. Volume I. Executive Summary.
Final rept.,
Harold L. Stalford. 12 Nov 79, 60p R-303U, 1273-VOL-1, NADC-76097-30-VOL-1
Contract N62269-76-C-0342
See also Volume 2, AD-A079 923.

This report (Volume I) summarizes the development and application of the 'Estimation-Before-Modeling (EBM) method for aircraft parameter identification in the non-linear flight regime. The method utilizes a 'Two-step approach wherein model independent states, forces and moments are first estimated and then state and control dependent model parametes are obtained using a Stepwise Multiple Linear Regression (SLMR) approach. In the second step (SLMR) the angle of attack and sideslip and control input space for all available flight data is divided into small subspaces and force and moment coefficients are modeled within each subspace. The method is applied to both simulated and actual flight data for a T-2C jet trainer aircraft in the stall and post-stall flight regimes. Volumes II and III of this report present detailed description of the EBM method and its application. (Author)

AD-A080 042/5 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Measurement of Moments of Inertia and Principal Inertia Axis of a Gnat Aircraft.
Technical rept.,
R. L. Poulter. Jul 79, 29p RAE-TR-79090, DRIC-BR-70939

The modifications made to a ground rig used to measure moments of inertia, and the technique developed to minimise errors in the moment of inertia in roll, are described. Calibration of the rig shows that acceptable accuracies are obtained, and results for the moments of inertia in roll and pitch, and the inclination of the principal inertia axis of the Gnat aircraft are given. Three fuel states, empty, external tanks full and internal tanks full, were tested, and comparisons are made with estimated values where possible. (Author)

AD-B006 024/4 PC **A10**/MF **A01**
Mcdonnell Aircraft CO St Louis Mo
Definition Study for an Advanced Fighter Digital Flight Control System.
Final rept. Mar 74-May 75,
David S. Hooker, Ira G. Pope, George R. Smith, and George J. Vetsch. Jun 75, 201p AFFDL-TR-75-59
Contract F33615-74-C-3047
Distribution limitation now removed.

The Definition Study for an Advanced Fighter Digital Flight Control System is an exploratory definition study of which a principal objective is to derive and evaluate custom multimode control laws, related displays, and multichannel digital fly-by-wire implementation schemes for advanced Air Force and Navy fighters. Study results show that a triplex flight control system provides the lowest weight, the best maintainability, and the lowest cost of the candidate configurations considered. Results also indicate that mission-oriented flight control laws integrated with compatible displays and controllers can provide enhanced mission effectiveness and reduced pilot workload. It is recommended that the concepts analyzed and simulated during this definition study be implemented and evaluated by flight testing.

AD-B007 465/8 PC **A09**/MF **A01**
General Dynamics/Fort Worth Tex Fort Worth Div
Advanced Metallic Air Vehicle Structure Program.
Interim rept. no. 4, 16 Jun-15 Dec 74,
C. E. Hart, R. C. Bissell, E. J. Bilhartz, D. Clayton, and E. F. Cox. Jun 75, 193p AFFDL-TR-75-40
Contract F33615-73-C-3001
Distribution limitation now removed.

This report covers the manufacture of the wing carrythrough structure and the test fixture structure during the latter portion of Phase III, Fabrication. Included are design and analysis in support of manufacture and additional material testing, component testing and manufacturing research and development work funded as a part of the Credible Option added task. All detail parts and subassemblies for the wing carrythrough structure (WCTS) are complete. Final assembly of the WCTS is progressing on schedule toward a 31 January 1975 completion date. After final assembly of the WCTS the remaining strain gages will be installed and the dummy wing will be prefit prior to shipment to AFFDL/FBT at WPAFB. Manufacture of all elements of the test fixture is substantially complete. The test fixture base is reassembled at WPAFB. The forward upper test fixture structure is at AFFDL/FBT at WPAFB being reassembled. The aft upper test fixture structure is being disassembled at Fort Worth in preparation for an early January 1975 delivery to WPAFB. The Advanced Metallic Air Vehicle Structure (AMAVS) Program is progressing on schedule toward a May 1975 start of testing in the Structural Test Facility at WPAFB. Fifteen months of static, fatigue and damage tolerance testing are planned. (Author)

AD-B007 943/4 PC **A06**/MF **A01**
Science Applications Inc El Segundo Calif

Computer Programs for Calculating Small Disturbance Transonic Flows about Oscillating Planar Wings.
Users manual Nov 74-Aug 75,
J. L. Farr, Jr., R. M. Traci, and E. D. Albano. Aug 75, 107p SAI-76-547-LA, AFFDL-TR-75-103
Contract F33615-74-C-3094
Distribution limitation now removed.

Computer programs are described which implement a small disturbance potential flow theory for the three-dimensional unsteady transonic flow about rectangular planar wings undergoing harmonic oscillations. The theory is based upon the treatment of the unsteady flow as a small perturbation to the steady transonic flow. Separating the perturbation potential into a steady and unsteady component results in a pair of coupled boundary value problems for the components. The governing equation for the steady perturbation potential is the usual nonlinear transonic potential equation and it is solved in computer program TDSTRN using the mixed differencing relaxation procedure of Murman and Cole. The governing equation for the unsteady perturbation potential is linear and, for the harmonic boundary disturbance considered, of mixed elliptic hyperbolic type depending on the local nature of the steady potential. Using a steady solution previously generated by TDSTRN computer program TDUTRN solves the unsteady potential equation by the same relaxation procedure. The solution procedures are found to be quite efficient, permitting the calculation of unsteady aerodynamic forces to engineering accuracy in a few minutes on a CDC 6600 computer. (Author)

AD-B008 124/0 PC **A09**/MF **A01**
Science Applications Inc El Segundo Calif
Small Disturbance Transonic Flows About Oscillating Airfoils and Planar Wings.
Final rept. Jun 74-Jun 75,
R. M. Traci, E. D. Albano, and J. L. Farr, Jr. Aug 75, 179p SAI-76-543-LA, AFFDL-TR-75-100
Contract F33615-74-C-3094
Distribution limitation now removed.

A theory and numerical solution method are presented for the problem of two or three dimensional flow about thin wings undergoing harmonic oscillations. The theory is based on a treatment of the unsteady flow as a small perturbation on the nonlinear steady flow. The coupled governing equations for the steady and unsteady perturbation potentials are of mixed elliptic/hyperbolic type and are solved using the mixed differencing line relaxation techniques of Murman and Cole. The theory and solution method have been generalized to treat subsonic or supersonic freestream flows, solid or porous wall effects and three dimensional flow about planar wings. Calculations demonstrating each of these capabilities are presented. Accuracy of the method for realistic steady and unsteady flows is examined by comparison to more exact numerical results and experimental data. The comparison indicates that the present method provides a useful and efficient inviscid solution. Quantitative differences between the present results and experimental data are attributed primarily to viscous effects, pointing out the importance of such effects for transonic flows.

AD-B015 025/0 PC **A12**/MF **A01**
Honeywell Inc Minneapolis Minn Systems and Research Center
Active Control Synthesis for Flexible Vehicles. Volume III. KONPACT User's Manual.
Final rept. Apr 75-Apr 76,
A. F. Konar, C. R. Stone, J. K. Mahesh, and M. Hank. Jul 76, 263p AFFDL-TR-75-146-Vol-3
Contract F33615-75-C-3046
Distribution limitation now removed

KONPACT is a system of digital computer programs that will design optimal or sub-optimal control systems especially for aircraft with lightly damped modes. This program represents advanced computational techiques to perform modern control synthesis, analysis, and design of automatic control systems. KONPACT augments aircraft mathematical models produced from such advanced programs as the FLEXSTAB Level 2.01.00 with control system dynamics and the designs and analyzes quadratic optimal or suboptimal control systems. The KONPACT User's Manual is the third volume of a report prepared under contract F33615-75-C-3046. This manual is arranged to aid the user in preparing input data decks, and executing the programs. This volume also contains two C-5A demonstration examples and results. The user background is assumed in the area of the dynamics of aircraft and control system design.

AD-B015 198/5 PC **A14**/MF **A01**
Honeywell Inc Minneapolis Minn Systems and Research Center
Active Control Synthesis for Flexible Vehicles. Volume I. KONPACT Theoretical Description.
Final rept. Apr 75-Apr 76,
A. F. Konar, C. R. Stone, J. K. Mahesh, and M. Hank. Jun 76, 301p 76-SRC-20-Vol-1, AFFDL-TR-75-146-Vol-1
Contract F33615-75-C-3046
See Also Volume 2, AD-B015 216L.
Distribution limitation now removed.

KONPACT is a system of digital computer programs that will rapidly design optimal or suboptimal control systems especially for aircraft with lightly damped modes. This program represents advanced computational techniques to perform modern control synthesis, analysis, and design of automatic control systems. KONPACT augments aircraft mathematical models produced from such advanced programs as the FLEXSTAB Level 2.01.00 with control system dynamics and then designs and analyzes quadratic optimal or suboptimal control systems. The KONPACT Theoretical Description is the first volume of report prepared under Contract F33615-75-C3046. It contains the mathematical description of algorithms used in KONPACT as well as active control synthesis procedures and their application to Active Life Description Control System (ALDCS) design. It also contains the results of a short study for the effects of model residualization and truncation procedures on control system performance. (Author)

AD-B015 216/5 PC **A15**/MF **A01**
Honeywell Inc Minneapolis Minn Systems and Research Center
Active Control Synthesis for Flexible Vehicles. Volume II. KONPACT Program Listing.
Final rept. Apr 75-Apr 76,
A. F. Konar, C. R. Stone, J. K. Mahesh, and M. Hank. Jan 76, 326p 76-SRC/20-Vol-2, AFFDL-TR-75-146-Vol-2
Contract F33615-75-C-3046
See also Volume 3, AD-B015 025L.
Distribution limitation now removed.

KONPACT is a system of computer programs that will design optimal or suboptimal control systems especially for aircraft with lightly damped modes. This program represents advanced computational techniques to perform modern control synthesis, analysis and design of automatic control systems. These programs augment aircraft mathematical models produced from such advanced program as the FLEXSTAB Level 2.01.00 with control system dynamics and then design and analyze quadratic optimal or suboptimal control systems. This report contains the program listings of KONPACT.

AD-B021 180/5 PC **A06**/MF **A01**
Mathematical Sciences Northwest Inc Bellevue Wash
Stress Analysis of Aircraft Tires. Volume I. Analytical Formulation.
Final rept. 24 Jun 74-8 Jan 76,
Alexander L. Deak. Feb 76, 116p MSNW-75-317-1, AFFDL-TR-76-11-Vol-1
Contract F33615-74-C-3102
See also Volume 2, AD-B021 181L.
Distribution limitation now removed.

Presented is the nonlinear finite element analysis of multi-layered aircraft tires. A piecewise parabolic shear stress distribution is introduced to cope with arbitrary stress distribution across the thickness coordinate. Each layer is an orthotropic ply consisting of cords embedded in an elastic rubber matrix. Triangular plate elements are used with five generalized displacements at the nodes. The computer code is written for the CDC-6600 machine under the Scope 3.3 and 3.4.3 operating systems. (Author)

AD-B021 181/3 PC **A03**/MF **A01**
Mathematical Sciences Northwest Inc Bellevue Wash
Stress Analysis of Aircraft Tires. Volume II. User's Manual.
Final rept. 24 Jun 74-8 Jan 76,
Alexander L. Deak. Feb 76, 40p MSNW-75-317-2, AFFDL-TR-76-11-Vol-2
Contract F33615-74-C-3102
See also Volume 1, AD-B021 180L.
Distribution limitation now removed.

Presented is the nonlinear finite element analysis of multi-layered aircraft tires. A piecewise parabolic shear stress distribution is introduced to cope with arbitrary stress distribution across the thickness coordinate. Each layer is an orthotropic ply consisting of cords embedded in an elastic rubber matrix. Triangular plate elements are used with five generalized displacements at the nodes. The computer code is written for the CDC-6600 machine under the Scope 3.3 and 3.4.3 operating systems. (Author)

AD-B023 254/6 PC **A03**/MF **A01**
Air Force Flight Test Center Edwards AFB Calif
Feasibility Investigation of a Two-Stage, Platform-Mounted Airdrop System.
Final rept. 29 Jul 74-23 Apr 75,
John Krizauskas. Jul 75, 34p Rept no. AFFTC-TR-75-22
Distribution limitation now removed.

This report presents the results of a test program conducted to investigate the feasibility of a two-stage, platform-mounted airdrop system. Nineteen platform airdrop tests were conducted from C-130 aircraft. Tests were conducted at an indicated airspeed of 130 or 150 knots. Tests were initiated at mean sea level (MSL) altitudes ranging from 8,060 to 10,620 feet. The extracted weight of the loads ranged from 2700 to 15,200 pounds. Displacements, velocities, event times, and photographic coverage were obtained on all tests. Selected forces on components in the test system were measured on all but one test. The most significant problem encountered during this program was test load oscillation during first stage descent. Recommendations are made on methods employed to reduce test load oscillation.

N80-16042/7 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Possible Markets for Dirigibles.
Dec 79, 110p NASA-TM-75937
Contract NASW-3199
Tran-Transl. Into English of "Les Marches Possibles du Dirigeable", Rept. From Secretariat d'Etat Aupres du Ministre de l'Equipement (Transports), Paris, Sep. 1977 p 1-132. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Transconsult, Paris.

The use of mini, small, medium, and heavy dirigibles for the transportation of passengers and cargo, for aerial handling of materials, for the support of scientific platforms, and for use in agriculture and forest management is evaluated. The operational efficiency of one or more dirigibles in view of possible integration into the general transport system is described.

N80-16065/8 PC **A09**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Systems and Research Center.
Digital Adaptive Controllers for VTOL Vehicles. Volume 1: Concept Evaluation.
Final Report.
G. L. Hartmann, G. Stein, and S. G. Pratt. Nov 79, 196p NASA-CR-159154-V-1, HONEYWELL-2825-41592-V-1
Contract NAS1-14921
Seri-2.

A digital self-adaptive flight control system was developed for flight test in the VTOL approach and landing technology (VALT) research aircraft (a modified CH-47 helicopter). The control laws accept commands from an automatic on-board guidance system. The primary objective of the control laws is to provide good command-following with a minimum cross-axis response. Three attitudes and vertical velocity are separately commanded. Adaptation of the control laws is based

on information from rate and attitude gyros and a vertical velocity measurement. The final design resulted from a comparison of two different adaptive concepts--one based on explicit parameter estimates from a real-time maximum-likelihood estimation algorithm, the other based on an implicit model reference adaptive system. The two designs were compared on the basis of performance and complexity.

N80-16066/6 PC **A05**/MF **A01**
Honeywell, Inc., Minneapolis, MN.
Digital Adaptive Controllers for VTOL Vehicles. Volume 2: Software Documentation.
Final Report.
G. L. Hartman, G. Stein, and S. G. Pratt. Nov 79, 90p NASA-CR-159154-V-2, HONEYWELL-2825-41592-V-2
Contract NAS1-14921
Seri-2.

The VTOL approach and landing test (VALT) adaptive software is documented. Two self-adaptive algorithms, one based on an implicit model reference design and the other on an explicit parameter estimation technique were evaluated. The organization of the software, user options, and a nominal set of input data are presented along with a flow chart and program listing of each algorithm.

PAT-APPL-6-061 534 PC **A02**/MF **A01**
Department of the Navy Washington DC
Quick Releasing High Strength Connector.
Patent Application,
George W. Sawn. Filed 24 Jul 79, 9p AD-D006 812/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device for rapidly securing and releasing a helicopter is provided. The device effects positive haul down of an aircraft from a landing attitude above a landing pad aboard ship to a predetermined landing position on the pad, among other uses, through a plurality of rotatable spring-loaded over-center dogs clamped onto the free end of a haul-down cable and a sliding, cylindrical spring-loaded latching device which maintains the dogs in clamped relationship with the haul-down cable. The haul-down cable is instantly released upon freeing of the dogs. (Author)

PAT-APPL-6-082 353 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Streamline Afterbody for an Ejection Seat.
Patent Application,
D. E. Swanson. Filed 5 Oct 79, 11p AD-D006 820/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application avaialble NTIS.

The ejection seat on a high performance aircraft is provided with a plurality of inflatable air bags on the back of the seat. The air bags are generally elliptical in cross-section and arranged one above the other in two parallel vertical rows on a supporting pallet attached to the seat back. Suitable gas generators cause the air bags to inflate in sequence top-to-bottom as the seat ejects from the aircraft to produce a rearwardly extending generally streamline afterbody thereby reducing aerodynamic drag and stabilizing the seat with its occupant after emergency ejection. (Author)

PAT-APPL-6-092 818 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Aircraft Ejection Seat Safetying Device.
Patent Application,
Filed 9 Nov 79, 10p AD-D006 891/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of the application available NTIS.

The device retains the ejection seat arm/dearm lever in safe position to allow the seat to be tilted safely for required maintenance and repair work. A bolt positioned through a clearance hole in an inverted U-shaped base member engages threads in the ejection seat structure. An upstanding brace extends upward from one end of the base member at an angle to abut the seat ejection arming lever to physically block and prevent its movement into the armed position. The bolt is retained in the base member by a cotter pin through the body of the bolt under the head to allow turning while preventing separation from the base. (Author)

PAT-APPL-6-100 321 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Soft Landing Gear.
Patent Application,
Louis T. Kramer. Filed 5 Dec 79, 16p AD-D006 884/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a bogie type landing gear especially suitable for providing soft landing capabilities for short take-off and landing (STOL) aircraft wherein fore and aft wheels are mounted on opposite ends of a bogie which is pivotally attached to the lowered end of a vertical shock strut. In one embodiment, a torque link pivotally connects the aft end of the bogie to the shock strut such that, under normal landing conditions, the front wheel will touch down first thereby reducing and directing the landing forces to minimize shock to the aircraft. The aft mounted torque links also act as a tension memeber during the initial landing stroke. In another embodiment, a damper acts as a tension stop for a soft landing arrangement as well as to dampen bogie motion over bumps with the torque links being separate. (Author)

PATENT-4 169 568 Not available NTIS
Department of the Navy Washington DC
Hermetically Sealed Parachute Container.
Patent,
Gene R. Drew, Herman M. Gylseth, William O. Van Buskirk, and Richard V. Newkirk. Filed 14 Nov 77, patented 2 Oct 79, 9p AD-D006 861/9, PAT-APPL-851 336
Supersedes PAT-APPL-851 336-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A parachute container for aircrew ejection seats is designed with a rigid body having a reduced volume and weight, and which is hermetically sealed and filled with an inert gas to extend service life without maintenance, the container being provided with a detachable, flexible cover to permit the container to expand in volume proportional to the reduction of external atmospheric pressure. The cover is made of an elastomeric material having elastic memory capable of returning to its preformed shape as atmospheric pressure increases, repeated in operations from sea level to high altitudes. (Author)

1D. Aircraft Flight Control and Instrumentation

AD-A080 047/4 PC **A04**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
Comparison of Specifications for Head-Up Displays in the Navy A-4M, A-7E, AV-8A, and F-14A Aircraft.
Special rept.,
Lawrence H. Frank. 5 Nov 79, 65p Rept no. NAMRL-SR-79-6

This report provides, within a single document, a compendium of data on Head-Up Displays (HUDs) in U.S. Navy and U.S. Marine Corps aircraft that is germane to a Human Factors assessment of HUD design on pilot performance. The data in this report are compiled from current Naval Air Training and Operating Procedures Standardization (NATOPS) manuals and design specifications for each of the HUD units. Operational HUDs were found to vary dramatically from each other and the military specification for HUDs, MIL-D-81641(AS), with respect to symbology and formating. Furthermore, display clutter was reported by pilots to be a major problem. A comprehensive information processing evaluation of virtual image symbols and formating under dynamic conditions was recommended. Finally, none of the current Navy aircraft has a HUD control panel that complies to MIL-D-81641(AS), the military specification for HUDs. Pilots are required to bring their eyes back into the cockpit to ensure proper switch selection and, consequently, negate the primary purpose of maintaining a head-up mode.

AD-B008 987/0 PC **A05**/MF **A01**
Texas Instruments Inc Dallas Equipment Group
Digital Signal Transfer Unit Multisensor Display System.
Final rept. 1 Feb-15 Dec 73,
Glen Towson, and Thurman Thrasher. Dec 75, 85p TI-C1-122425-1048, AFAL-TR-74-131
Contract F33615-73-C-1212
Distribution limitation now removed.

This report describes the development and testing of a Digital Signal Transfer Unit Multisensor Display System (DSTUMDS) for the F-4E aircraft. The objective of the program was to develop a new avionics display system that offers non-degraded performance, an improved operator-system interface, growth capability, and improved reliability. In addition, the equipment was designed and developed as a direct replacement for the analog Multisensor Display Group (MSDG) presently found in production F-4E aircraft, with no requirement for aircraft modifications or wiring changes. The DSTUMDS provides non-degraded display presentations of both low refresh rate radar data and high refresh rate electro-optical sensor information on the same display monitor. The electro-optical sensor information is displayed directly on the short persistence phosphor cathode ray tube without being processed. Digital processing techniques and random access memory technology are used to convert the radar data input rate to a suitable display output rate.

AD-B009 489/6 PC **A09**/MF **A01**
Spectronics Inc Richardson Tex
Optical Couplers.
Interim technical rept. Oct 73-Jun 74,
James R. Biard, and John E. Shaunfield. Dec 75, 181p AFAL-TR-74-314
Contract F33615-74-C-1001
Distribution limitation now removed.

This document is an interim report describing the development of optical couplers for use in an eight station EMI/EMP resistant avionic data bus being developed on this program. Airborne avionics systems are moving toward the use of party line multiplex data buses for the transmission of the growing number of digital signals found in modern aircraft. Optoelectronic technology provides a data bus interface system consistent with military requirements that is potentially superior to wire techniques--particularly in the areas of ground loop noise immunity and EMI/EMP sensitivity. Passive optical directional couplers are required in an optoelectronic data bus so that each station can receive optical signals from the bus and transmit optical signals onto the bus. By this means, each station on the bus can communicate with every other station. The report identifies the basic optical loss and attenuation mechanisms that affect the quality of optical couplers and describes the techniques developed to minimize these losses. Since low-loss fiber optic bundle terminations are required at all optical interfaces, this topic is discussed separately. Conventional termiantions are described which have losses of 34.8%; compression techniques are described that reduce the loss to 24.4%.

1E. Air Facilities

AD-A079 552/6 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Glide Slope Special Evaluation Report. McConnell AFB, Kansas 19 - 24 April 1979,
Richard L. Valentine. 17 Dec 79, 34p Rept no. 79/66S-184

This report presents the results of the 17-24 April 1979 TRACALS Evaluation of the McConnell AN/MRN-8 (Glide Slope) for runway 36R. The evaluation was conducted to optimize the glide slope's performance and document the results. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment or screening. (Author)

AD-A079 591/4 MF **A01**
Yang (Nai C) and Associates New York
Nondestructive Evaluation of Airport Pavements. Volume III. Operation Manual for MLGPAV Program at TCC.
Final rept.,
David Yang. Sep 79, 48p FAA/RD-78/154-3
Contract DOT-FA77-WA-3964
See also Volume 1, AD-A078 835.
Availability: Microfiche copies only.

Sensitivity analysis of aircraft parameters on functional pavement design is the primary goal of the MLGPAV program at the Transportation Computer Center (TCC) in Washington, D.C. The program is an integrated system which is data independent based on defined mathematical models and operational logic. The input data is divided into job and universal default inputs. The job inputs consist of only the aircraft data such as: (1) forecast of aircraft movements; (2) maximum takeoff weight; (3) natural frequency of aircraft at tire pavement interface; (4) tire pressure of main landing gear wheel; (5) wheel configuration of main landing gear and (6) gear spacing. The default system contains all of the data independent of the aircraft, such as: (1) regional cost values; (2) types of facility, runway, taxiway, apron; (3) navigation system; (4) operation speed; (5) roughness and maintenance standards; (6) subgrade conditions and (7) airport traffic distribution. A unified mechanistic method is used to design five types of functional pavements for identical service requirements on riding quality and maintenance needs. They are: (1) asphalt pavements in southern or northern region; (2) concrete pavements on stabilized or aggregate base and (3) full depth stabilized base pavement.

AD-A079 747/2 PC **A06**/MF **A01**
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
Predicting the Fatigue Life of Flexible Airfield Pavements--A Recommended Approach.
Final rept. Jul 78-Jun 79,
Dale S. Decker. Jul 79, 123p AFESC/ESL-TR-79-26
Contract F29601-76-C-0015

The pavement engineer currently has no realistic means of predicting the fatigue life of an existing asphalt pavement or the service of a new asphalt pavement surface. The development of information that would enable engineers to make realistic fatigue life predictions, and thereby to make the best use of the increasingly scarce pavement maintenance dollar, is critically needed. This report reviews current fatigue and routine design test methods and examines the effects of materials and environmental conditions on fatigue life. The extensive literature review indicates a possibility that fatigue life may be estimated by correlating known fatigue parameters with results of routine design tests. The repeated-load indirect tensile (fatigue) test and the resilient modulus indirect tensile (routine design) test are recommended for use in U.S. Air Force investigations.

2. AGRICULTURE

2A. Agricultural Chemistry

PB80-137755 PC **A03**/MF **A01**
California Univ., Riverside. Dept. of Soil and Environmental Sciences.
Effects of Acid Precipitation on Soil Leachate Quality: Computer Calculations.
Final rept. May-Oct 79,
Garrison Sposito, A. L. Page, and Mark E. Frink. Jan 80, 50p EPA-600/3-80-015

The multipurpose computer program GEOCHEM was employed to calculate the equilibrium speciation in twenty-three examples of acid precipitation from New Hampshire, New York, and Maine, and in the same number of mixtures of acid precipitation with minerals characteristic of soils in the three states mentioned. Between 100 and 200 soluble inorganic and organic complexes were taken into account in each speciation calculation. The calculations performed on the acid precipitation samples showed that the metals (including heavy metals) and the sulfate, chloride, and nitrate ligands would be almost entirely in their free ionic forms, while the phosphate, carbonate, ammonia, and organic ligands would be in their protonated forms. This result was independent of the geographic location of the acid precipitation and the month of the year in which it was collected. The speciation calculations on the precipitation-soil mineral mixtures showed that aluminum and iron levels in a soil solution affected by acid precipitation would be significantly higher than in one whose chemistry is dominated by carbonic acid. It was also shown that soil cation exchangers would adsorb preferentially heavy metals, such as Cd and Pb, which are found in acid precipitation.

2B. Agricultural Economics

PB80-135577 PC **E07**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Range Science.
Regional Analysis and Management of Environmental Systems.
Progress rept.,
D. A. Jameson. May 75, 267p NSF-RA-E-75-378
Grant NSF-ESR72-03396
Document includes 3 sheets of 48x reduction microfiche. See also report dated Jun 75, PB-288 027.

An overall procedure is presented for dealing with land management problems, including social goal identification, information collecting and synthesis, and selection of alternatives. The setting is that of a self-adaptive or cybernetic system. Procedures based on commonly accepted methodologies of various disciplines are utilized in each subsection and have been applied to a sample grassland region described in the appendix. Operational computer programs have been developed for each procedure. Some of the accomplishments include: a multidimensional scaling technique in goal identification; goal programming in regional management; construction of economic input/output demographic simulation models in regional simulation; linear programming procedures for individual firm management; construction of an economic simulation model; and development of computerized mapping procedures.

PB80-138837 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
The Farm Credit System: Some Opportunities for Improvement.
Report to the Congress.
25 Jan 80, 79p CED-80-12

The Farm Credit System provides credit to farmers and ranchers through three separate banking systems. If these systems were consolidated, unneeded competition and overlapping responsibilities and services would be eliminated and costs could potentially be reduced. The System has been providing credit and services for some purposes which go beyond agricultural needs, such as for marginal farming operations, obtaining tax advantages, and recreational purposes. But in many cases, farm income alone is not sufficient to make the loan installments. This report recommends that the Congress require the Federal Farm Credit Board to determine how best to consolidate the three banking systems and to prepare legislation to accomplish such a consolidation. The report also recommends that the Federal Farm Credit Board and the Governor of the Farm Credit Administration improve lending operations and supervision.

PB80-140957 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Changes in Farm Production and Efficiency, 1978.
Jan 80, 81p STATISTICAL BULL-628

The publication contains all historical data for the major statistical series on farm production, production inputs, and efficiency. It also provides in one place the latest information for appraising changes in production, changes in farm inputs and practices, improvements in labor productivity, and progress in farm mechanization.

2C. Agricultural Engineering

E80-10030 PC **A99**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Proceedings of Technical Sessions, Volumes 1 and 2: The LACIE Symposium Held at Houston, Texas on October 23-26, 1978.
Jul 79, 1096p NASA-TM-80811, JSC-16015
Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, SD. 57198. Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD., and Department of Agriculture, Washington, DC.

The technical design of the Large Area Crop Inventory Experiment is examined and data acquired over 3 global crop years is analyzed with respect to (1) sampling and aggregation; (2) growth size estimation; (3) classification and mensuration; (4) yield estimation; and (5) accuracy assessment. Seventy-nine papers delivered at conference sessions cover system implementation and operation; data processing systems; experiment results and accuracy; supporting research and technology; and the USDA application test system.

E80-10036 PC **A03**/MF **A01**
Canada Centre for Remote Sensing, Ottawa (Ontario).
Use of Thermal Infrared and Colour Infrared Imagery to Detect Crop Moisture Stress.
Interim rept.,
R. C. McKenzie, N. F. Clark, and J. Cihlar. Mar 79, 37p NASA-CR-162447

The author has identified the following significant results. In the presence of variable plant cover (primarily percent cover) and variable available water content, the remotely sensed apparent temperatures correlate closely with plant cover and poorly with soil water. To the extent that plant cover is not systematically related to available soil water, available water in the root zone values may not be reliably predicted from the thermal infrared data. On the other hand, if plant cover is uniform and the soil surface is shown in a minor way, the thermal data indicate plant stress and consequently available water in the soil profile.

PB80-137565 PC **A03**/MF **A01**
Idaho Univ., Moscow. Water Resources Research Inst.
Sagebrush to Cropland. A Western Water Project.
Research technical completion rept.,
John Francis, and Richard Schermerhorn. Mar 79, 32p W80-02772, OWRT-C-6276(5226)(1)

The Boise Irrigation project begun in Idaho in the early 1900's now spreads water through 1800 miles of canals to 340,000 acres or 530 square miles. The project, one of the first large Bureau of Reclamation projects, was analyzed during the 1970s to determine its total impact and to develop methodologies to examine such projects. Benefits-costs ratios since 1910 show that prior 1941 return on output was low but from World War II until the present the benefit-cost ratio has been as high as 21.29 to 1 in 1947 and no lower than 4.85 to 1 in 1953. In 1973, the latest year calculated, the ratio was 9.94 to 1. Direct impacts of the project are seen in the farming of varied crops. Construction costs, charged to water users, have mostly been paid off. Some farmers still have to pay $0.75 per acre until 1991. Water costs are low with farmers in one area getting all the water they need for $14 per acre.

PB80-143811 PC **A06**/MF **A01**
Belding, MI.
Reuse and Renovation of Sewage Stabilization Pond Effluent Through Irrigation.
Final rept. 1970-78,
Earl A. Myers, and Jeffrey C. Sutherland. Feb 80, 125p EPA-600/2-80-050
Prepared in cooperation with Williams and Works, Grand Rapids, MI.

The main objective of this project was to explore the recycling of stabilized pond effluent to grow crops for municipal beautification. The research encompassed pond effluent quality, irrigation site

parameters, crop responses, renovation qualities of site and crops, insects and winter irrigation. Levels of wastewater application were 51, 76, and 102 mm per week. The solid-set, buried, automatic lateral-change irrigation system functioned well.

PB80-144033 PC **A04**/MF **A01**
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Technological Choices in Sugar Processing.
Background paper,
G. B. Hagelberg, and E. W. Krause. 5 Oct 78, 53p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar. Sponsored in part by Agency for International Development, Washington, DC. Prepared in cooperation with Intermediate Technology Development Group, London (England).

The report covers sugar manufacturing technologies and products; criteria for the comparison and evaluation of alternative sugar processing technologies; and directions of research and development in the field of intermediate sugar processing technologies.

2D. Agronomy and Horticulture

PB80-138373 PC **A03**/MF **A01**
California Univ., Davis. Dept. of Plant Pathology.
Effects of Various Methods of Rice Straw Disposal on the Epidemiology of Rice Stem Rot.
Final rept.,
Robert K. Webster, and W. W. Bockus. Sep 78, 32p ARB-R-78/105

Scleroti oryzae (the cause of stem rot) overwinters either in rice residue or free in the soil. Previous studies have shown that burning of rice residue is more effective in limiting carry-over and increases in inoculum levels than soil incorporation. A three year study was carried out to compare the effects on inoculum levels of straw removal by fall and spring burning as compared to soil incorporation. The results indicate that harvest of straw at or near ground level followed by removal of residue as completely as possible is as effective in minimizing stem rot inoculum levels as is fall or spring burning under conditions of continuous rice cropping.

PB80-147937 PC **A99**/MF **A01**
International Center for Arid and Semi-Arid Land Studies, Lubbock, TX.
Arid Land Plant Resources: Proceedings of the International Arid Lands Conference on Plant Resources Held at Lubbock, Texas on October 8-15, 1978,
J. R. Goodin, and David K. Northington. Jul 79, 735p NSF/RA-790353
Grants NSF-AER76-24472, NSF-AER76-82387
Sponsored in part by Grant NSF-ISP77-04295.

This report covers developments of new and unused arid land plant resources for food, forage, medicinal, and industrial uses. This subject is especially pertinent in view of the alarming rate at which an ever-increasing global population consumes existing developed resources. The origin and evolution of arid and semi-arid lands are described with emphasis on desert soils and vegetation. Examples of papers on plant resources for the various applications include studies of the jojoba, guayule, and juncus plants, woody plants and fuels from biomass, and salt tolerant crops (the latter harvested for direct human consumption). The workshops comprise research topics together with plant ecology, management, and improvement.

2E. Animal Husbandry

PB80-144900 PC **A05**/MF **A01**
Food and Drug Administration, Rockville, MD. Bureau of Veterinary Medicine.
FDA Veterinarian: 1979 Compilation and Index,
Linda Isner. Feb 80, 92p FDA/BVM-80/53, BVM-80-1

The FDA VETERINARIAN is a publication of the Bureau of Veterinary Medicine's (BVM) Information Services Staff concerning the Bureau's activities in the regulation of animal drugs, devices, feeds, and related topics. FEDERAL REGISTER documents pertaining to BVM are routinely covered in the publication, in addition to other items the Bureau feels are of interest to veterinarians, producers, the drug and feed industry, industry news media, and educational institutions.

PB80-920800 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section IV. Veterinary Medicine. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $34.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920899.

The standing order allows one to obtain updates to Section IV of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters and Offices and Bureaus in accomplishing FDA's regulatory obligations for veterinary medicines and feeds. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920899 PC**$12.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section IV. Veterinary Medicine.
1980, 303p FDA/ACA-80/28D
Updates to basic report available as PB80-920800. Complete manual available as PB80-920499. See also PB80-920599, PB80-920699, PB80-920799, PB80-920999, and PB80-921099.

Section IV of the Compliance Program Guidance Manual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for veterinary medicines and feeds. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

2F. Forestry

PB80-128630 PC**$5.75**
Johns Hopkins Univ., Baltimore, MD. Dept. of Geography and Environmental Engineering.
Vegetation Map of Maryland. The Existing Natural Forests,
Grace Somers Brush, Cecilia Lenk, and Joanne Smith. Jul 76, 25p PPSP/MAP/RP-21
See also PB80-128622.
Also available in set of 2 reports PC E06, PB80-128614.

The topographic map shows forest tree and woody plant associations and their location throughout the state of Maryland. Also indicated on the map are cross sections of the vegetation and substrates which has a predictive value in the management of terrestrial ecosystems.

PB80-139801 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta. Environmental Resources Center.
An Improved Sediment Delivery Model for Piedmont Forests.
Technical completion rept.,
Richard G. Burns. Jun 79, 84p ERC-03-79, W80-03081, OWRT-A-053-GA(1)
Prepared in cooperation with Georgia Univ., Athens. School of Forest Resources.

Two similar watersheds in the pine production area of the central Georgia piedmont were studied to develop an improved sediment delivery model for use as a management tool for forest harvesting and site preparation. Eight watershed segments were instrumented in the treated basin and four in the untreated control basin. The treated basin was commercially clearcut then prepared in two stages with drum roller choppers. Thirty-one sets of data were collected for rainfall, runoff, and fine sediment delivery. Other data collected include the occurrence, location, and condition of all bare soil in each area during each phase of harvesting and site preparation. The model, based in part on the 'universal soil loss equation' has three components: energy, site, and erosion hazard. Use of the W hazard index indicates that minimal bare soil and maximum distance to stream channels are important management concerns for forest harvest practices.

PB80-140775 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
The Timber Industries of New Hampshire and Vermont.
Forest Service resource bulletin,
James T. Bones, Nicolas Engalichev, and William G. Gove. 1974, 33p FSRB/NE-35, NEFES-80-25

The report is a complete survey of the timber industries in New Hampshire and Vermont. The report contains statistics about roundwood production and receipts, and production and disposition of the manufacturing residues that result. Comparisons are made with the most recent previous surveys, and trends in industrial wood output are noted.

PB80-141005 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Natural Fuel Loadings in Ponderosa Pine and Mixed Conifer Forests of the Southwest.
Forest Service research paper (Final),
Stephen S. Sackett. Dec 79, 16p FSRP-RM-213

Accurate estimates of natural fuel loading are needed in a variety of situations, such as predicting fire behavior and damage; preattack planning; developing fuel management plans; assessing fire potential in and around residential developments in forests; and as an aid to silviculturists, landscape architects, wildlife biologists, and land use planners. Natural dead fuel loading in 62 undisturbed southwestern ponderosa pine stands averaged 21.9 tons per acre. Sixteen mixed conifer stands averaged 44.1 tons per acre of dead fuel. Heavy humus loads contributed to loading of 22.2 tons per acre of fuel.

PB80-141021 PC **A07**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
The Timber Resources of Maine.
Forest Service resource bulletin,
Roland H. Ferguson, and Neal P. Kingsley. 1972, 134p FSRB/NE-26, NEFES-80-15
Color illustrations reproduced in black and white.

The report is a statistical and analytical report of the second forest survey of Maine by the USDA Forest Service. Statistical findings are based on the remeasurement of 1.5-acre plots and new 10-point cluster plots. This report discusses and analyzes trends in forest-land area, timber volume, annual growth, and timber removals. Timber products output by forest industries, based upon a canvas of industries in 1970, and the importance of timber to the State's economy, are also discussed. The report includes an outlook for timber supplies during the next 30 years and discusses forest-management opportunities.

PB80-141146 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
The Timber Industries of New Jersey and Delaware.
Forest Service resource bulletin,
James T. Bones. 1973, 22p FSRB/NE-28, NEFES-80-17

The report is a field canvass of all known primary wood manufacturers that operated in Delaware and New Jersey in 1970. The industrial wood statistics are compared with previous surveys and important trends in industry development are noted. Total roundwood output was down 31 percent in Delaware since 1956, and down 43 percent in New Jersey since 1955.

PB80-141153 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.

Establishment and Early Growth of Conifers on Compact Soils in Urban Areas.
Forest Service research paper (Final),
Robert P. Zisa, Howard G. Halverson, and Benjamin B. Stout. 1980, 12p FSRP/NE-451, NEFES-80-19

Three northeastern urban coniferous species were able to establish themselves from seed at soil bulk densities up to 1.6 to 1.8 g/cu cm. Root penetration was restricted at a bulk density between 1.4 and 1.6 g/cu cm. Soil type made a significant difference in establishment and root growth.

PB80-141161 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Pulpwood Production in the Northeast, 1970.
Forest Service resource bulletin,
James T. Bones, and David R. Dickson. 1971, 39p FSRB/NE-24, NEFES-80-13
See also report dated 1967, PB-185 114.Color illustrations reproduced in black and white.

The report contains data about pulpwood production from roundwood in the 14 Northeasern States by counties and species groups, and pulpwood chip production from plant residues. Comparisons are made with the previous year's production data. Trends in pulpwood production for the past 8 years are shown for the Northeast.

PB80-141203 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Recovery Potential of Fire-Damaged Southwestern Ponderosa Pine.
Research note (Final),
John H. Dieterich. Dec 79, 10p FSRN-RM-379
Color illustrations reproduced in black and white.

The survival potential of fire-damaged ponderosa pine is dependent on many factors, including season when the fire occurs, percentage of crown scorch, and consumption of live crown material. Other factors influencing survival include site conditions, available growing season moisture, and incidence of insect attacks.

PB80-141534 PC **A09**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
The Timber Resources of New York.
Forest Service resource bulletin,
Roland H. Ferguson, and Carl E. Mayer. 1970, 198p FSRB/NE-20, NEFES-80-9
Color illustrations reproduced in black and white.

The report is a resurvey made 18 years after the initial survey was made by the USDA Forest Service. Statistical findings on forest-land area, timber volume, annual growth, and timber removal, based upon remeasured 1/5-acre plots and new 10-point cluster plots are given. It reports timber products output by forest industries, based upon a canvass in 1967, and changes and trends in the timber resource. It includes data on employment in the timber-related industries and value added by industries, and an outlook on timber-supply and management opportunities. Includes 90 tables of statistical data for the State, geographic units, and counties.

PB80-148760 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Response to Crop-Tree Release by 7-Year-Old-Stems of Red Maple Stump Sprouts and Northern Red Oak Advance Reproduction.
Forest Service research paper,
G. R. Trimble, Jr. 1974, 10p FSRP-NE-203, NEFES/80-52

This paper deals with crop-tree release of two species typical of a fair site: red maple stump sprouts and northern red oak advance reproduction. A study was made to test the feasibility of doing a crop-tree release immediately after the canopy closed and crown classes could be distinguished. The study was made in a 7-year-old even-aged hardwood stand on the Fernow Experimental Forest near Parsons, West Virginia.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A079 590/6 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
High-Resolution Line Profiles of T Tauri Stars.
Timothy J. Schneeberger, Simon P. Worden, and M. Susan Wilkerson. 20 Feb 79, 23p Rept no. AFGL-TR-80-0015
Pub. in the Astrophysical Jnl. Supplement Series, v41 n3 p369-389 Nov 79.

No abstract available.

AD-A079 612/8 PC **A02**/MF **A01**
Iowa Univ Iowa City Dept of Physics and Astronomy
The Volume Emissivity of Type III Radio Bursts.
Progress rept.,
R. L. Tokar, and D. A. Gurnett. Sep 79, 21p Rept no. U. of IOWA-79-41
Contracts N00014-76-C-0016, NAS5-11431

The volume emissivity has been calculated for thirty-six type III solar radio bursts obtained from approximately 6.5 years of IMP 8 and ISEE 1 satellite data. Although the emissivities for these events vary over a large range, all the emissivities decrease rapidly with increasing heliocentric radial distance. The best fit power law for the emissivity, using the average power law index for all events analyzed, is J equal J sub zero R to the minus 6th power, with J sub zero equal 1.5 times ten to the minus 24th power watts/cu m/ster. This best fit emissivity is used to estimate the expected radial variation of the plasma oscillations responsible for the type III radio emission.

N80-16260/5 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Technique to Determine Location of Radio Sources from Measurements Taken on Spinning Spacecraft.
J. Fainberg. Nov 79, 57p NASA-TM-80598
Subm-Submitted for Publication.

The procedure developed to extract average source direction and average source size from spin-modulated radio astronomy data measured on the IMP-6 spacecraft is described. Because all measurements are used, rather than just finding maxima or minima in the data, the method is very sensitive, even in the presence of large amounts of noise. The technique is applicable to all experiments with directivity characteristics. It is suitable for onboard processing on satellites to reduce the data flow to Earth. The application to spin-modulated nonpolarized radio astronomy data is made and includes the effects of noise, background, and second source interference. The analysis was tested with computer simulated data and the results agree with analytic predictions. Applications of this method with IMP-6 radio data have led to: (1) determination of source positions of traveling solar radio bursts at large distances from the Sun; (2) mapping of magnetospheric radio emissions by radio triangulation; and (3) detection of low frequency radio emissions from Jupiter and Saturn.

N80-16851/1 PC **A03**/MF **A01**
Hawaii Univ., Honolulu. Inst. for Astronomy.
Non-Maxwellian Velocity Distribution Functions Associated with Steep Temperature Gradients in the Solar Transition Region. Paper 1: Estimate of the Electron Velocity Distribution Functions.
R. Roussel-dupre. 1979, 49p NASA-CR-162696
Contract NAS5-22409, Grant NSG-7536

It was shown that, in the presence of the steep temperature gradients characteristic of EUV models of the solar transition region, the electron and proton velocity distribution functions are non-Maxwellian and are characterized by high energy tails. The magnitude of these tails are estimated for a model of the transition region and the heat flux is calculated at a maximum of 30 percent greater than predicted by collision-dominated theory.

N80-16852/9 PC **A02**/MF **A01**
Hawaii Univ., Honolulu. Inst. of Astronomy.
Non-Maxwellian Velocity Distribution Functions Associated with Steep Temperature Gradients in the Solar Transition Region. Paper 2: The Effect of Non-Maxwellian Electron Distribution Functions on Ionization Equilibrium Calculations for Carbon, Nitrogen and Oxygen.
R. Roussel-dupre. 1979, 21p NASA-CR-162695
Contract NAS5-22409, Grant NSG-7536

Non-Maxwellian electron velocity distribution functions, previously computed for Dupree's model of the solar transition region are used to calculate ionization rates for ions of carbon, nitrogen, and oxygen. Ionization equilibrium populations for these ions are then computed and compared with similar calculations assuming Maxwellian distribution functions for the electrons. The results show that the ion populations change (compared to the values computed with a Maxwellian) in some cases by several orders of magnitude depending on the ion and its temperature of formation.

N80-16986/5 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Physics and Astronomy.
Helium Runaways in White Dwarfs.
R. E. Taam. 8 Aug 79, 22p NASA-CR-162694

The long term evolution of an accreting carbon white dwarf was studied from the onset of accretion to the ignition of helium. The variations in the details of the helium shell flash examined with respect to variations in mass accretion rate. For intermediate rates the helium flash is potentially explosive whereas for high rates the shell flash is relatively weak. The results are discussed in the context of the long term evolution of novae.

N80-16987/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Characteristics of the Telescope for High Energy gamma-Ray Astronomy Selected for Definition Studies on the gamma Ray Observatory.
E. B. Hughes, R. Hofstadter, A. Johansson, J. Rolfe, and D. L. Bertsch. Oct 79, 26p NASA-TM-80590
Contracts NAS5-25544, NGR-05-020-452
Subm-Submitted for Publication. Conf-Presented at IEEE 1979 Sci. Symp., San Francisco, 17-19 Oct. 1979.

The high energy gamma-ray selected for definition studies on the Gamma Ray Observatory provides a substantial improvement in observational capability over earlier instruments. It will have about 20 times more sensitivity, cover a much broader energy range, have considerably better energy resolution and provide a significantly improved angular resolution. The design and performance are described.

N80-16988/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
UBVR Observation of V1357 Cyg = Cyg X-1. Search of the Optical Radiation of the Accretion Disk.
V. S. Shevchenko. Nov 79, 20p NASA-TM-75677, PR-408
Contract NASW-3198
Tran-Transl. Into English of "Ubvr Nablyudeniya V 1387 Cyg = Cyg X-1. Poisk Opticheskogo Izlucheniya Akkretsionnogo Diska," Rept. Pr-408 Acad. Of Sci. USSR, Inst. Of Space Res., Moscow, 1978 p 1-22. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Data from 30 nights of V 1357 Cyg observations in July, August, and September of 1977 are presented. The contribution of the disk to the optic brightness of the system is computed with regard for the heating of its surface by uitraviolet radiation from V 1357 Cyg and X-ray radiation from Cyg X-1. The disk radiation explains the irregular variability in the system brightness. The possibility of the eclipse of the star by the disk and the disk by the star is discussed.

N80-16989/9 PC **A02**/MF **A01**
Harvard Coll. Observatory, Cambridge, MA.

X-Ray Observations of a Compact Binary Source.
Final Report, 1 Jul. - 31 Dec. 1979.
A. K. Dupree. 1979, 6p NASA-CR-162750
Grant NSG-5312

Simultaneous X-ray and ultraviolet measurements of selected binary X-ray sources can provide a unique probe of the wind structure and mass loss phenomena in an extended stellar atmosphere. Measurements of the X-ray flux from Vela X-1 (HC8 77581) and 4U1700-37 (HD153919) obtained by OAO 3 and IUE are discussed.

N80-16997/2 PC **A02**/MF **A01**
Harvard Coll. Observatory, Cambridge, MA.
Studies of the Local Interstellar Medium.
Final Report, 1 May - 30 Sep. 1979.
A. K. Dupree. 1979, 13p NASA-CR-162749
Grant NSG-5293

The existing ultraviolet and optical data concerning late-type stars are discussed along with the acquisition and reduction of additional ultraviolet and simultaneous ground-based observation. The stars Alpha Centauri A, and Lamdba Andromedia are discussed in terms of stellar chromospheres, or the instellar medium.

N80-17001/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Narrow-Band Jovian Kilometric Radiation: A New Radio Component.
M. L. Kaiser, and M. D. Desch. Jan 80, 16p
NASA-TM-80626
Subm-Submitted for Publication.

A new component of Jupiter's radio spectrum is investigated. The component emits in a very narrow bandwidth (less than or equal to 40 kHz) near 100 kHz. Its waveform is a very smooth and gradual rise and subsequent fall in intensity, usually over two hours. The emission is polarized with left hand polarization associated with the Jovian northern magnetic hemisphere and right hand with the south. The emissions deviation from a strict system 3 rotation period repetition rate is examined. The emission source of the narrow band component which rotates 3 to 5 percent slower than all other forms of Jovian radio emission is determined from propagation considerations, coupled with the observed lack of corotation, to a source region near the equatorial plane at the outer edge of the Io plasma torus. The narrow band KOM (nKOM) form is examined using observations from the PRA instrument. The spectrum and occurrence statistics are described and contrasted with the tapered or broadband KOM (bKOM) characteristics.

N80-17002/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Occurence Rate, Polarization Character and Intensity of Broadband Jovian Kilometric Radiation.
M. D. Desch, and M. L. Kaiser. Jan 80, 26p
NASA-TM-80627
Subm-Submitted for Publication.

The major observational features of one new component of Jupiter's radio emission spectrum, the broadband kilometer-wavelenth radiation or bKOM are described. The Voyager planetary radio astronomy experiments reveal that the overall occurrence morphology, total power, and polarization character of bKOM are strong functions of the latitude and/or local time geometry of the observations. The post-encounter data show a decline in the mean occurrence rates and power level of bKOM and, in particular, a depletion in the occurrence rate at those same longitudes where the detection rate is a maximum before encounter. Additionally, the polarization sense undergoes a permanent reversal in sign after encounter, whereas the time-averaged wave axial ratio and degrees of polarization remain relatively unchanged. No evidence of any control by Io is found. The strong dependence of the morphology on local time suggests a source whose beam is nearly fixed relative to the Jupiter-sun line.

N80-17003/8 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Voyager 1: Encounter with Jupiter.
Mar 79, 44p NASA-CR-162721, JPL-400-11
Misc-Original Contains Color Illustrations.

An overview of the Voyager is presented along with samples of the nearly 19,000 photographs returned by Voyager 1 spacecraft at the midpoint of its 38-month mission to Jupiter and Saturn. Particular emphasis is given to color photographs of the Great Red Spot, and the surface features of the Galliiean satellites.

N80-17004/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
The Stratigraphic Sequence of Volcanic and Sedimentary Units in the North Polar Region of MARS.
M. E. Botts. Jan 80, 69p NASA-TM-78254

Based on photogeologic mapping of Viking orbiter images of Mars, four distinct informal stratigraphic units are defined for the region north of 70 degrees N latitude. They are: (a) bulbous plains, (b) mantled plains, (c) dune deposits, and (d) layered deposits/perennial ice. Background information on the Martian polar caps is provided from telescopic observation, Mariner mission results, and Viking mission results (August 1976-November 1978). A description, and an interpretation and distribution of the stratigraphic units are presented. Surface winds, which were determined from dune orientations, and discussed and implications for the source of circumpolar dune materials are delineated. A list of the Viking Orbiter imagery used in the research, the computer programs for crater size frequency distributions, and the crater size frequency data are presented.

N80-17005/3 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
Analysis of Erosion and Transportation Features from Lunar Orbiter and Apollo Photography.
Final Technical Report, 15 Jun. 1977 - 31 Jul. 1978.
T. Gold. 1980, 11p NASA-CR-162703
Grant NSG-7348

Certain classes of surface features in Lunar Orbiter and Apollo Panoramic Photographs are identifed and possible correlations between the occurrence of these features and their geographical location on the Moon are studied. Whether evidence of erosion and transport processes not encountered on Earth exists is investigated using the lunar photographs. The variety and intensity of transport processes on the Moon resulting from exposure to plasmas is discussed.

N80-17006/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Structure and Microphysical Properties of the Clouds of Venus.
M. Y. Marov. Aug 79, 64p NASA-TM-75725, PREPRINT-144
Contract NASW-3199
Tran-Transl. Into English of "Struktura I Mikrofizicheskiye Svoistva Oblakov Venery", Preprint-144 Acad. Of Sci. USSR, Inst. Of Applied Mathematics, Moscow, 1978 p 1-69. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Results are presented from the processing and interpretation of measurement data in the descent capsules of the automatic stations Venera-9 and Venera-10 for the characteristics of light scattering in the atmosphere of Venus by means of onboard nephelometers. A model for the aerosol component in the planet's atmosphere in the altitude range 62-14 km is proposed.

N80-17011/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Energy Spectra of Cosmic Ray Nuclei to Above 100 Gev/Nucleon.
M. Simon, H. Spiegelhauer, W. K. H. Schmidt, F. Siohan, and J. F. Ormes. Oct 79, 43p NASA-TM-80587
Subm-Submitted for Publication.

The chemical composition cosmic rays as a function of energy in the range of a few GeV/nucleon to some hundreds of GeV/nucleon for boron through iron are presented. The experiment combined an ionization spectrometer and a gas Cherenkov counter, which was flown on a balloon, to perform two different and independent energy measurements. The experimental apparatus is described in detail. The energy dependence of the cosmic ray escape length for boron and iron is reported and predicted changes in the energy dependence of the ratios of primary nuclei O/C and iron/C+O are discussed.

N80-17012/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD. High Energy Astrophysics Lab.
The Unique Cosmic Event of 1979 March 5.
T. L. Cline. Dec 79, 17p NASA-TM-80630
Subm-Submitted for Publication.

A transient that appears to be neither a typical gamma ray burst nor an X-ray burster was found to possess a variety of unusual properties that would seem to be mutually inconsistent. The observed parameters include a 200 microsecond onset time, a subsequent temporal intensity oscillation with an 0 second period, a spectral feature consistent with a moderately red shifted positron annihilation line, a maximum photon flux greater than any known gamma ray or x ray transient, and a very accurate source location measurement consistent with that of the N49 supernova remnant associated with the large Magellanic Cloud at 55 kpc distance.

PB80-141658 Not available NTIS
National Bureau of Standards, Washington, DC.
Lyman Alpha Initiated Winds in Late-Type Stars.
Final rept.,
B. M. Haisch, J. L. Linsky, and K. .A van der Hucht. 1979, 11p
Grant NAS5-23274
Pub. in Proceedings of Symposium on The First Year of IUE, Held at London, England on Apr 4-6, 1979, p383-393, 1979.

One of the first major results of the IUE survey of late-type stars was the discovery of a sharp division in the HR diagram between stars with solar type spectra (chromosphere and transition region lines) and those with non-solar type spectra (only chromosphere lines). This result is especially interesting in view of observational evidence for mass loss from G and K giants and supergiants discussed recently by both Reimers and Stencel. The authors have calculated models of both hot coronae and cool wind flows using stellar model chromospheres as starting points for stellar wind calculations in order to investigate the possibility of having a 'supersonic transition locus' in the HR diagram dividing hot coronae from cool winds. The authors conclude from these models that the L flux may play an important role in determining the location of a stellar wind critical point. The authors investigate in detail the interaction of L radiation pressure with Alfven waves in producing strong, low temperature stellar winds in the star Arcturus.

PB80-146160 PC **A09**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 423. Part I (Prompt Reports). Data for October 1979, September 1979,
Helen E. Coffey. Nov 79, 179p SGD-423-PT-1, NOAA-79122801
See also Number 421, Part 1, PB80-128747.

This prompt report provides data for October 1979 on: alert periods, daily solar indices, solar flares, solar radio emission, spacecraft observations, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, coronal holes, and Boulder Geomagnetic Substorm Log. It also provides data for September 1979 on: daily solar activity center, sudden ionospheric disturbances, solar x-ray radiation, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices.

PB80-146178 PC **A05**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.

Solar-Geophysical Data Number 423, November 1979. Part II (Comprehensive Reports). Data for May 1979, March 1979 and Miscellanea,
Helen E. Coffey. Nov 79, 96p SGD-423-PT-2, NOAA-79122802
See also Number 421, Part 2, PB80-128754.

This comprehensive report provides data for May 1979 on: solar radio emission, energetic solar particles and plasma, and solar x-ray radiation. The data for March 1979 consists of: solar flares, synoptic charts, and abbreviated calendar record. The miscellaneous data includes solar flares, spacecraft observations and coronal holes for September 1979, solar radio emission for July and August 1979, cosmic rays for August 1979, regional flare index for February 1979 and stacked magnetograms for selected events in 1978.

PB80-805732 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Eclipses (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Brian Carrigan. Mar 80, 174p
Supersedes NTIS/PS-79/0181, NTIS/PS-78/0241, and NTIS/PS-77/0250.

The bibliography cites observations of solar radiation, solar corona, and effects on the earth's atmosphere, taken during solar eclipses. Observations of eclipses from 1961 are included. (This updated bibliography contains 167 abstracts, 3 of which are new entries to the previous edition.)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A079 568/2 Not available NTIS
Iowa Univ Iowa City Dept of Physics and Astronomy
Observations Pertaining to the Dynamics of the Plasma Sheet,
R. J. DeCoster, and L. A. Frank. 17 Jan 78, 23p
Contract NAS5-11064, Grant NGL-16-001-002
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Pub. in Jnl. of Geophysical Research, v84 nA9 p5099-5121, 1 Sep 79 (No copies furnished by DTIC).

No abstract available.

AD-A079 792/8 PC **A04**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
Short-Time Mass Variation in Natural Atmospheric Dust.
Technical rept.,
Teddy L. Barber. Nov 79, 51p Rept no. ERADCOM/ASL-TR-0045

Aerosols are not perfectly mixed in the atmosphere, but reside in miniclouds, even in a relatively clear atmosphere. This report presents a mathematical treatment relating mass loading to optical backscatter, and some of the inherent problems in examining light scattering from natural dust in a theoretical manner are discussed. Lidar backscatter data were taken in a desert environment and related to mass loading variations over 30-second periods. Four of the 30-second segments of the data are presented. In these four segments, the estimated relative mass loading was observed to fluctuate up and down with the highest mass loading about eight times that of the lowest mass loading. These mass loading fluctuations were observed at one position 15 meters above the ground. (Author)

AD-A079 976/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Experimental Research on Artificially Triggered Lightning,
Sya Yu-ren, Syau Ching-sya, and Lyu Yung-jen.
28 Sep 79, 10p Rept no. FTD-ID(RS)T-1177-79
Edited trans. of Scientia Atmospherica Sinica (China) v3 n1 p94-97 1979.

No abstract available.

N80-16060/9 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Air Pollution from Aircraft.
J. B. Heywood, J. A. Fay, and N. A. Chigier. Oct 79, 47p NASA-CR-159712
Contract NGR-22-009-378

A series of fundamental problems related to jet engine air pollution and combustion were examined. These include soot formation and oxidation, nitric oxide and carbon monoxide emissions mechanisms, pollutant dispension, flow and combustion characteristics of the NASA swirl can combustor, fuel atomization and fuel-air mixing processes, fuel spray drop velocity and size measurement, ignition and blowout. A summary of this work, and a bibliography of 41 theses and publications which describe this work, with abstracts, is included.

N80-16575/6 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Summary of Aircraft Results for 1978 Southeastern Virginia Urban Plume Measurement Study of Ozone, Nitrogen Oxides, and Methane.
G. L. Gregory, D. E. Wornom, J. J. Mathis, Jr., and D. I. Sebacher. Feb 80, 222p NASA-TM-80146, L-12981

Ozone production was determined from aircraft and surface in situ measurements, as well as from an airborne laser absorption spectrometer. Three aircraft and approximately 10 surface stations provided air-quality data. Extensive meteorological, mixing-layer-height, and ozone-precursor data were also measured. Approximately 50 hrs (9 flight days) of data from the aircraft equipped to monitor ozone, nitrogen oxides, dewpoint temperature, and temperature are presented. In addition, each experiment conducted is discussed.

N80-16645/7 PC **A03**/MF **A01**
Finnish Meteorological Inst., Helsinki.
Magnetic Results from Nurmijaervi Geophysical Observatory, 1978.
1979, 35p ISBN-951-697-125-3, ISSN-0071-5212

Observed magnetic results for 1978 are presented in tabular form. The data include declination, horizontal intensity, vertical intensity, diurnal variation, monthly means, and K-indices.

N80-16648/1 PC **A02**/MF **A01**
Ionospheric Prediction Service, Darlinghurst (Australia).
Analysis of Numerical Ionograms. 3: The Valley Program.
A. K. Paul, T. L. Gulyaeva, L. F. Mcnamara, J. E. Titheridge, and J. W. Wright. Oct 78, 24p IPS-X8

Accurate numerical ionograms corresponding to daytime electron density profiles containing an E-F valley have been analyzed by four different methods. It is found that the methods of analysis due to Paul and Titheridge can determine the height of the F layer just above the valley to within a few km. The method used by Wright, on the other hand, leads to underestimates of this height by about 10-20 km. For most profiles, Gulyaeva's method yields errors of 5-10 km, but in some cases overestimates of up to 30 km can occur.

N80-16649/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
The Influence of Variations in Ozone Concentration on the Temperature Regime of the Atmosphere.
L. R. Rakipova. Jun 79, 6p NASA-TM-75350
Contract NASW-3198
Tran-Transl. Into English from Transactions (USSR), Leningrad, 1974 p 359-361. Misc-Original Language Document Previously Announced as A74-37733. Subm-Transl. By Scitran, Box 5456, Santa Barbara, Calif. Conf-Presented at the 1ST All-Union Conf., Moscow, 30 Oct. - 1 Nov. 1972.

The results of a study of the effects provided by changes in the concentration of atmospheric ozone on the mean temperatures of the troposphere and lower stratosphere are presented. It was found that ozone must be considered no less important in producing climatic changes than is CO2.

N80-17007/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Mechanism of Temperature and Pressure Changes in the Earth's Atmosphere During Solar Flares.
V. D. Reshetov. Jun 79, 11p NASA-TM-75349
Contract NASW-3198
Tran. of 'O Mekhanizme Izmenenia Temperatury i Davlenia V Atmosfere Zemli Pri Solnechnykh Vspyshkakh', 1974 p 288-296. Misc-Original Language Document Was Announced as A74-37725. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Conf-Presented at 1ST All-Union Conf. On Sun Atmosphere Relations in Climate Theory and Weather Forecasts, Moscow, Oct. - 1 Nov. 1972 p288-296.

The affect of solar flares on the weather on Earth is examined. It is concluded that the processes which arise in the atmosphere are so intricate that a single calculation of solar activity is insufficient for long-range forecasting. However, combined consideration of processes dependent upon the cynamic instability of the atmosphere and the effect of solar activity will contribute to the improvement of long-range forecasts.

PB80-131980 PC **A07**/MF **A01**
Environmental Sciences Research Lab., Reserch Triangle Park, NC.
Photochemistry of Some Naturally Emitted Hydrocarbons.
Research rept.,
Robert R. Arnts, and Bruce W. Gay, Jr. Sep 79, 140p EPA-600/3-79-081

Six C10H16 monoterpenes, p-cymene, and isoprene, all known or thought to be emitted to the atmosphere by vegetation, were irradiated in the presence of NOx. The terpenes studied included one acyclic triolefin (myrcene), two monocyclic diolefins (d-limonene, terpinolene), and three bicyclic monolefins (alpha-pinene, beta-pinene, and delta-carene). Propylene was also studied since this olefin serves as a point of reference with other chamber studies. Results showed that monoterpenes and isoprene promoted the oxidation of NO to NO2 and were themselves consumed at rates comparable to or greater than propylene; p-cymene was decidedly slow in these respects. The monoterpenes however did not permit the buildup of ozone due to their rapid reaction with ozone. The ozone suppression was particularly noticeable at high carbon/NOx ratios. Deciduous forests, isoprene emitters, are coniferous forests. Coniferous forests may in fact function as a sink for ozone. Reported ambient concentrations of isoprene and terpenic hydrocarbons in forested areas are too low to account for more than a few ppb of ozone even if NOx is available.

PB80-137623 PC **A10**/MF **A01**
Radian Corp., Austin, TX.
Emissions Update and Projections for Indiana Air Quality Maintenance Areas. Volume III. Lake and Porter Counties.
Final rept.,
C. P. Bartosh, B. P. Cerepaka, W. J. Moltz, and M. R. Piana. Mar 77, 215p RAD-77-100-044-13-10, EPA/905/2-77/002B
Contract EPA-68-02-1383
See also Volume 4, PB80-137631.

The implementation of the strategy for reduction of pollutant emissions has resulted in reduced ambient concentrations of TSP and SO2. Current levels of air quality in Lake and Porter Counties, however, indicate that progress has not been sufficient to attain the NAAQS. At present, it is not known whether the problem lies in lack of strict enforcement of the SIP or whether the SIP is in itself insufficient. In order to make this determination, the State of Indiana initiated a review of the current SIP. Radian Corporation was retained to perform an update of the area source portion of the review. The update was designed to determine the area source emissions at a level of accuracy consistent with the higher level of detail described in the Guidelines for Air Quality Maintenance Planning and Analysis. To determine if problems will be encountered in maintaining air quality standards in the future, area and point source emissions were projected for the years 1980 and 1985.

PB80-137631 PC **A12**/MF **A01**
Radian Corp., Austin, TX.

Emissions Update and Projections for Indiana Air Quality Maintenance Areas. Volume IV. Vanderburgh County, Indiana and Henderson and Daviess Counties, Kentucky.
Final rept.,
C. P. Bartosh, B. P. Cerepaka, W. J. Moltz, M. R. Piana, and R. L. Lipscomb. Mar 77, 275p RAD-77-100-044-13-011, EPA/905/2-77/002C
Contract EPA-68-02-1383
See also Volume 3, PB80-137623.

The implementation of the strategy for reduction of pollutant emissions has resulted in reduced ambient concentrations of TSP and SO2. Current levels of air quality in the study area, however, indicate that progress has not been sufficient to attain the NAAQS. At present, it is not known whether the problem lies in lack of strict enforcement of the SIP or whether the SIP is in itself insufficient. In order to make this determination, the State of Indiana initiated a review of the current SIP. Radian Corporation was retained to perform an update of the area source portion of the review. The update was designed to determine the area source emissions at a level of accuracy consistent with the higher level of detail described in the Guidelines for Air Quality Maintenance Planning and Analysis. To determine if problems will be encountered in maintaining air quality standards in the future, area and point source emissions were projected for the years 1975, 1980, and 1985.

PB80-138308 PC **A04**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
An Empirical Relationship Between Mesoscale Carbon Monoxide Concentrations and Vehicular Emission Rates.
Final rept.,
Gerardo G. Clemena. Jul 79, 53p VHTRC-80-R2, FHWA/VA-80/02
Sponsored in part by Virginia Dept. of Highways and Transportation, Richmond.

Presented is a relatively simple empirical equation that reasonably approximates the relationship between mesoscale carbon monoxide (CO) concentrations, areal vehicular CO emission rates, and the meteorological factors of wind speed and mixing height. The approximation is an extension of rollback modeling and was derived from aerometric data measured at a major urban area in Virginia. A similar equation has been found valid for data measured at another major urban area. Transportation planners can use such an approximation in conjunction with a grid inventory of areal vehicular CO emissions to obtain an areal profile of mesoscale CO concentrations. Such an approximation would be preferable to the complex and potentially more accurate diffusion models when reliable input data are not available, which is often the case. It can be used by air quality planners involved in the project-level analyses to estimate the existing worst-case background levels of CO at a proposed urban highway site. This estimation can then be combined with the predicted worst-case CO contribution from the proposed highway project to determine if expensive air monitoring is necessary.

PB80-139918 PC **A09**/MF **A01**
SRI International, Menlo Park, CA.
Assessment of Vertical Distributions of Photochemical Pollutants and Meteorological Variables in the Vicinity of Urban Areas.
Final rept.,
F. L. Ludwig. Aug 79, 185p EPA-450/4-79-017
Contract EPA-68-02-2662

A system for classifying vertical profiles of ozone and other photochemical pollutants has been derived by analyzing 268 ozone profiles obtained from published reports and EPA data files. The profiles fall into six different categories that are related to the relative importance of the following factors: destruction of ozone near the surface, vertical mixing, and photochemical production. The report presents and discusses 108 representative examples of the vertical profiles, most with corresponding temperature data and many with aerosol (nephelometer), NOx, or hydrocarbon data. Linear regression has been used to define the relation between ozone concentrations in the mixing layer and those aloft, for the different profile types. The locations relative to an urban area and the times when each profile type is most apt to occur are discussed in terms of the statistics of the data set and the physical processes involved.

PB80-142706 PC **A07**/MF **A01**
SRI International, Menlo Park, CA.
Atmospheric Distributions, Sources and Sinks of Selected Halocarbons, Hydrocarbons, SF6, and N20.
Final rept.,
H. B. Singh, L. J. Salas, H. Shigeishi, A. J. Smith, and E. Scribner. Nov 79, 149p EPA-600/3-79-107
Grant EPA-8038020

Global distributions of a large number of halocarbons, hydrocarbons, SF6, and N2O are presented. These data are complemented with measurements in the polluted environments to establish urban-nonurban relationships of these species. Atmospheric growth rates of selected species are characterized based on measurements conducted between 1975 and 1978.

PB80-143290 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Atmospheric Physics and Chemistry Lab.
Telephotometric Study of Baseline Visual Range at Cedar Mountain, Utah, October 12 to November 10, 1978.
Data rept.,
Paul A. Aliee, and Mark B. Cozad. Sep 79, 51p NOAA-DR-ERL-APCL-5, NOAA-79121208

This data report presents visual range values derived from telephotometric measurements at Cedar Mountain, Emery County, Utah, from October 12 through November 10, 1978. Results are presented for the visual ranges of four views. Supplementary visual ranges of two distant mountain ranges, the Henry Mountains at 72 miles and the Abajo Mountains at 110 miles, are also given.

PB80-146087 PC **A05**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Geomagnetic Observatories 1978,
C. Sucksdorff, H. Nevanlinna, and K. L. Svendsen. Nov 79, 95p SE-21
Prepared in cooperation with Finnish Meteorological Inst., Helsinki.

This publication describes 209 of the known geomagnetic observatories throughout the world. Based on response to a questionnaire distributed by the Working Group on Magnetic Observatories for the International Association of Geomagnetism and Aeronomy (IAGA), the report includes information on the various observatories data reporting and exchange, recording instruments and methods of baseline control, as well as ordering the observatories according to name, latitude and country. Included are a copy of the questionnaire and IAGA resolutions concerning magnetic observatories adopted since 1963.

PB80-805757 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution Atmospheric Motion (Citations from the NTIS Data Base).
Rept. for 1970-Feb 80,
Brian Carrigan. Mar 80, 133p
Supersedes NTIS/PS-79/0147, NTIS/PS-78/0210, and NTIS/PS-77/0225.

The modeling, diffusion, and motion of motor vehicle exhaust emissions is presented in these citations. These reports were chosen because of possible interest to those involved with the prediction of pollution from motor vehicles or entire highway systems. (This updated bibliography contains 126 abstracts, 9 of which are new entries to the previous edition.)

4B. Meteorology

AD-A079 640/9 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Lake Champlain Ice Formation and Ice Free Dates and Predictions from Meteorological Indicators,
Roy E. Bates, and Mary-Lynn Brown. Nov 79, 30p Rept no. CRREL-79-26

A 19-year record of the annual closing and opening dates of operation of the Lake Champlain ferry at Grand Isle, Vermont, which are controlled by the lake's ice cover, was made available to CRREL. These navigation records accurately approximated the freeze-over and breakup dates for the ferry crossing area between Gordon Landing, Vermont, and Cumberland Head, New York. When compared statistically with water temperature and climatological data for the same years at nearby Lake Champlain locations, the dates allowed accurate predictions of ice formation. From nearby air temperature records, cumulative freezing degree-day (deg C) curves were plotted for each year of record, and ice formation dates and standard deviations were predicted with considerable accuracy. Several methods of predicting ice formation on Lake Champlain were attempted. The most accurate approach used a combination of water temperatures and freezing degree-days. The influence of wind speed on ice cover formation and prediction are also discussed in the report. (Author)

AD-A079 831/4 MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Torrejon AB, Madrid, Spain. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
3 Oct 78, 429p Rept no. USAFETAC/DS-79/112
Availability: Microfiche copies only.

This report is a six-part statistical summary of surface weather observations for Torrejon AB, Madrid Spain. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 837/1 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Upper Heyford RAF, Bicester, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
12 Dec 78, 403p Rept no. USAFETAC/DS-79/097

This report is a six-part statistical summary of surface weather observations for Upper Heyford Raf, Bicester, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 838/9 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Ramstein AB, Landstuhl, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
10 Oct 78, 410p Rept no. USAFETAC/DA-79/101

This report is a six-part statistical summary of surface weather observations for Ramstein AB, Landstuhl, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 839/7 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Spangdahlem AB, Dudeldorf, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
19 Jan 79, 414p Rept no. USAFETAC/DS-79/102

This report is a six-part statistical summary of surface weather observations for Spangdahlem AB, Dudeldorf Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 840/5 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Clark AFB, Angeles, Philippines. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
22 Feb 79, 405p Rept no. USAFETAC/DS-79/104

This report is a six-part statistical summary of surface weather observations for Clark AB, Angeles, Philippines. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 841/3 PC **A17**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Hahn AB, Hunsbruck, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
29 Sep 78, 392p Rept no. USAFETAC/DS-79/105

This report is a six-part statistical summary of surface weather observations for Hahn AB, Hunsruck, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 842/1 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Dyess AFB, Abilene, Texas. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
16 Nov 78, 468p Rept no. USAFETAC/DS-79/107

This report is a six-part statistical summary of surface weather observations for Dyess AFB, Abilene, Texas. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 843/9 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Grand Forks AFB, Grand Forks, North Dakota. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
13 Oct 78, 475p Rept no. USAFETAC/DS-79/108

This report is a six-part statistical summary of surface weather observations for Grand Forks AFB, Grand Forks, North Dakota. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 844/7 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Anderson AFB, Agana, Guam. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
31 Aug 78, 413p Rept no. USAFETAC/DS-79/117

This report is a six-part statistical summary of surface weather observations for Anderson AFB, Agana, Guam. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 845/4 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Bitburg AB, Bitburg, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
20 Feb 79, 407p Rept no. USAFETAC/DS-79/116

This report is a six-part statistical summary of surface weather observations for Bitburg AB, Bitburg, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 846/2 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Carswell AFB, Fort Worth, Texas. Revised Uniform Summary of Surface Weather Observations. (RUSSWO) Parts A-F.
Final rept.
28 Aug 78, 458p Rept no. USAFETAC/DS-79/115

This report is a six-part statistical summary of surface weather observations for Carswell AFB, Fort Worth, Texas. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 847/0 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Grissom AFB, Peru, Indiana. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
30 Aug 78, 453p Rept no. USAFETAC/DS-79/114

This report is a six-part statistical summary of surface weather observations for GRISSOM AFB, Peru, Indiana. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds;

(D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 848/8 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
March AFB, Riverside, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
28 Nov 78, 473p Rept no. USAFETAC/DS-79/113

This report is a six-part statistical summary of surface weather observations for March AFB, Riverside, California. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 849/6 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Minot AFB, Minot, North Dakota. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
3 Nov 78, 479p Rept no. USAFETAC/DS-79/109

This report is a six-part statistical summary of surface weather observations for Minot AFB, Minot, North Dakota. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A079 901/5 MF **A01**
Weather Squadron (30th) Yongsan (Republic of Korea) Detachment 18
Terminal Forecast Reference Notebook.
7 Nov 79, 97p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Contents: Section A. Location, Topography and Local Effects; Section B. Weather Impact on Supported Units; Section C. Synoptic Climatology; Section D. Rules of Thumb; Section E. Forecast Studies; Section F. Climatology Data; Section G. Synoptic Case Studies; and Section H. Terminal Forecast Work and Preparation Sheet.

AD-A079 989/0 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19304D GSRS, Missile Number 1046, Round Number V-66, 23 August 1979.
Meteorological data rept.
Aug 79, 17p Rept no. ERADCOM/ASL-DR-1056
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 19304D GSRS, Missile Number 1046, Round Number V-66, are presented in tabular form. (Author)

AD-A079 990/8 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702A GSRS, Missile Number 310, Round Number B-33, 27 August 1979.
Meteorological data rept.
Aug 79, 21p Rept no. ERADCOM/ASL-DR-1057
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 19702A GSRS, Missile Number 301, Round Number B-33, are presented in tabular form. (Author)

AD-A079 991/6 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702A GSRS, Missile Number BR-3, Round Number B-35, 31 August 1979.
Meteorological data rept.
Aug 79, 23p Rept no. ERADCOM/ASL-DR-1061
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19702A GSRS, Missile Number BR-3, Round Number B-35, are presented in tabular form. (Author)

AD-A079 992/4 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702A GSRS, Missile Numbers 308, 309, Round Numbers B-31, B-32, 18 August 1979.
Meteorological data rept.
Aug 79, 24p Rept no. ERADCOM/ASL-DR-1055
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19702A GSRS, Missile Numbers 308, 309, Round Numbers B-31, B-32, are presented in tabular form. (Author)

AD-A079 993/2 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19306B GSRS, Missile Numbers 1043, 1045, Round Numbers V-64, V-65, 17 August 1979.
Meteorological data rept.
Aug 79, 34p Rept no. ERADCOM/ASL-DR-1054
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 19306B GSRS, Missile Numbers 1043, 1045, Round Numbers V-64, V-65, are presented in tabular form. (Author)

AD-A079 994/0 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19304B GSRS, Missile Numbers 1139, 1051 and 1037, Round Numbers V-61, V-62 and V-63, 9 August 1979.
Meteorological data rept.
Aug 79, 21p Rept no. ERADCOM/ASL-DR-1050
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19304B GSRS, Missile Numbers 1139, 1051 and 1037, Round Numbers V-61, V-62 and V-63, are presented in tabular form. (Author)

AD-A079 995/7 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
12821A LANCE, Missile Number 4819, Round Number 335 NCL, 13 August 1979.
Meteorological data rept.
Aug 79, 26p Rept no. ERADCOM/ASL-DR-1052
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 12821A LANCE, Missile Number 4819, Round Number 335 NCL, are presented by tabular forms. (Author)

AD-A079 999/9 PC **A02**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702A GSRS, Missile Number 004, Round Number B-30, 17 August 1979.
Meteorological data rept.
Aug 79, 22p Rept no. ERADCOM/ASL-DR-1053

Meteorological data gathered for the launching of 19702A GSRS, Missile Number 004, Round Number B-30, are presented in tabular form. (Author)

AD-A080 000/3 PC **A02**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702D GSRS, Missile Number 023, Round Number B-38, 8 September 1979.
Meteorological data rept.
Sep 79, 21p Rept no. ERADCOM/ASL-DR-1065

Meteorological data gathered for the launching of the 19702D GSRS, Missile Number 023, Round Number B-38 are presented in tabular form. (Author)

AD-A080 001/1 PC **A02**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19702A GSRS, Missile Number 311, Round Number B-39, 10 September 1979.
Meteorological data rept.
Sep 79, 21p Rept no. ERADCOM/ASL-DR-1067

Meteorological data gathered for the launching of 19702A GSRS, Missile Number 311, Round Number B-39 are presented in tabular form. (Author)

AD-A080 056/5 PC **A03**/MF **A01**
Naval Environmental Prediction Research Facility Monterey CA
A Use of Time Series in Improving Weather Forecasting.
Final rept.,
Frank D. Faulkner, Craig Comstock, and Robert R. Fossum. Nov 79, 27p Rept no. NEPRF-CR-79-07

Given the assumption that weather can be predicted more effectively by integrating the dynamic equations(s) than by examining trends, the question investigated here is whether time series can be used in the secondary routine to effect improvement. The method is described, the relevant equations are derived, a program using real meteorological data is made and run, and a measure of effectiveness is given. Limited study shows some definite promise. (Author)

AD-A080 062/3 PC **A02**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19304D GSRS, Missile Number 1063, Round Number V-67, 29 August 1979.
Meteorological data rept.
Aug 79, 19p Rept no. ERADCOM/ASL-DR-1058

Meteorological data gathered for the launching of 19304D GSRS, Missile Number. 1063, Round Number V-67, are presented in tabular form. (Author)

AD-A080 069/8 PC **A02**/MF **A01**
Weather Wing (3rd) Offutt AFB NE
Index of 3WW Technical Notes and Forecaster Memos.
Technical rept.,
James C. St. John. 2 Jan 80, 10p Rept no. 3WW/TN-80-001

Includes errata sheet dated 23 Jan 80.

This Technical Note lists all current technical notes and forecaster memos published by 3WW Aerospace Sciences. This TN will be updated annually. Users may update this index when appropriate. (Author)

N80-16675/4 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Thunderstorm-Environment Interactions Determined with Three-Dimensional Trajectories.
G. S. Wilson. Jan 80, 163p NASA-RP-1054

Diagnostically determined three dimensional trajectories were used to reveal some of the scale interaction processes that occur between convective storms and their environment. Data from NASA's fourth Atmospheric Variability Experiment are analyzed. Two intense squall lines and numerous reports of severe weather occurred during the period. Convective storm systems with good temporal and spatial continuity are shown to be related to the development and movement of short wave circulation systems aloft that propagate eastward within a zonal mid tropospheric wind pattern. These short wave systems are found to produce the potential instability and dynamic triggering needed for thunderstorm formation. The environmental flow patterns, relative to convective storm systems, are shown to produce large upward air parcel movements in excess of 50 mb/3h in the immediate vicinity of the storms. The air undergoing strong lifting originates as potentially unstable low level air traveling into the storm environment from southern and southwestern directions. The thermo and hydrodynamical processes that lead to changes in atmospheric structure before, during, and after convective storm formation are described using total time derivatives of pressure or net vertical displacement, potential temperature, and vector wind calculated by following air parcels.

N80-16676/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Wallops Station, Wallops Island, VA.
The Role of Satellite Altimetry in Climate Studies.
C. L. Parsons. Jan 80, 32p NASA-TP-1570

The results of three generations of satellite-borne radar altimetry experiments are summarized. The diverse measurements possible from this instrument are shown to be directly applicable to studies of the importance of the oceans in climate. The radar altimeter has unique value for investigations seeking knowledge of the interconnections between ocean dynamics, heat and momentum transfer across the air-sea interface, sea ice extent, and polar ice sheet thickness.

N80-16678/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Comparison of GLAS Sat and NMC High Resolution Nosat Forecasts from 19 and 11 February 1976.
R. Atlas. Nov 79, 19p NASA-TM-80591

A subjective comparison of the Goddard Laboratory for Atmospheric Sciences (GLAS) and the National Meteorological Center (NMC) high resolution model forecasts is presented. Two cases where NMC's operational model in 1976 had serious difficulties in forecasting for the United States were examined. For each of the cases, the GLAS model forecasts from initial conditions which included satellite sounding data were compared directly to the NMC higher resolution model forecasts, from initial conditions which excluded the satellite data. The comparison showed that the GLAS satellite forecasts significantly improved upon the current NMC operational model's predictions in both cases.

N80-16679/6 PC **A04**/MF **A01**
Institut Royal Meteorologique de Belgique, Brussels.
The Weather in 1978 le Temps en 1978.
R. Sneyers. 1979, 53p
Text in French.

The general atmospheric situation in Belgium was marked by the predominance of a depression regime from the middle of winter until the middle of summer. This predominance was followed by an anticyclonic regime which lasted until the end of the year. The persistent return of the anticyclonic regime from the middle of summer and the resulting rain deficit, the winter hygrometric deficit, and the mediocre thermal conditions from the middle of summer until the beginning of autumn are considered the most salient facts about Belgian weather in 1978. Variations in wind, air temperature, humidity, and precipitations are discussed for each month.

N80-16680/4 PC **A02**/MF **A01**
Institut Royal Meteorologique de Belgique, Brussels.
Recent Rain Measurement Maps of Belgium les Nouvelles Cartes Pluviometriques de la Belgique. De Nieuwe Pluviometrische Kaarten van Belgie.
G. L. Dupriez, and R. Sneyers. 1979, 20p
Misc-This Accession Also Covers All 1979 Issues Received to Date. Text in French and Flemish.

Meteorological charts of the normal rainfall in Belgium are presented. The charts are presented for each month of the year and show the average rainfall by altitude.

N80-16682/0 PC **A09**/MF **A01**
National Aeronautics and Space Administration. Wallops Station, Wallops Island, VA.
Results of the August 1977 Soviet and American Meterological Rocketsonde Intercomparison Held at Wallops Island, Virginia.
F. J. Schmidlin, J. R. Duke, A. I. Ivanovsky, and Y. M. Chernyshenko. Feb 80, 193p NASA-RP-1053
Subm-Prepared in Cooperation with the Hydrometeorological Service of the USSR.

A coordinated program of rocketsonde investigations along about 60 deg E and 70 deg W between the United States and U.S.S.R. is discussed. The rocketsonde instruments used by the U.S. and U.S.S.R. were compared and the results are presented. The U.S. Super Loki Datasonde and the U.S.S.R. M100B rocketsonde are discussed. Results indicate that the U.S/U.S.S.R. rocketsonde measurement agreement improved since the 1973 intercomparisons. It was learned that the mean of the differences of the temperatures compare to within 6 C at about 60 km and to within 2 C near 50 km. Wind measurements were also found to agree.

N80-16683/8 PC **A16**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL. Space Sciences Lab.
AVE-SESAME 1: 25-Mb Sounding Data.
M. L. Gerhard, H. E. Fuelberg, S. F. Williams, and R. E. Turner. Dec 79, 365p NASA-TM-78256

Seven atmospheric variability experiments (AVE), two atmospheric variability and severe storms experiments (AVSSE), and six atmospheric variability experiment-severe environmental storm and mesoscale experiments (AVE-SESAME) conducted by NASA are discussed. The dates, observation times, and data reports for each of the experiments for which data was processed are listed. The AVE experiments were conducted primarily to study atmospheric variability with emphasis on spatial and temporal in atmospheric structure that can be detected from soundings taken at 3 hr intervals but not seen in soundings taken at 12 hr intervals. The AVSSE experiments were conducted to study atmospheric structure and variability associated with severe storms combining both rawinsonde and aircraft data to provide information on near storm environments. The method of processing is discussed, estimates of the rms errors in the data are presented, an example of contact data is given, and soundings are listed which exhibited abnormal characteristics.

PB80-133614 PC **A11**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Observational Analysis of Tropical Cyclone Formation,
John L. McBride, and William M. Gray. Apr 79, 242p AS-PAPER-308
Grants NSF-ATM78-18962, NA79-RAD-00002
Sponsored in part by Contract N00228-76-C-2129, Navy Environmental Prediction Research Facility, Washington, DC.

This study investigates the genesis of tropical cyclones through a combination of the compositing approach and the case study approach. Twelve composite data sets are analyzed from the tropical Northwest Pacific and tropical Northwest Atlantic Oceans. Each data set is a composite average of approximately 80 individual disturbances. Four different types of non-developing oceanic tropical disturbances are composited. They are compared with pre-hurricane and pre-typhoon disturbances in each ocean composited at four different stages of intensification. In total, 912 different tropical weather systems go into the composites and approximately 40,000 rawinsonde observations are used. Vertically integrated budgets of heat, momentum and kinetic energy are performed on the composite data sets and physical hypotheses are made on the mechanisms of tropical cyclone genesis and development.

PB80-137706 PC **A02**/MF **A01**
Illinois State Water Survey, Urbana.
Spatial and Temporal Correlation of Precipitation in Illinois,
Floyd A. Huff. 1979, 19p ISWS/CIR-141/79, W80-02882

Analyses were made of the correlation patterns of annual, seasonal, monthly, storm, and partial storm precipitation in Illinois, with major emphasis on the warm season months of May-September when convective rainfall dominates and spatial variability maximizes. Data were from the climatic network of the National Weather Service in the annual analyses, and that from dense raingage networks of the State Water Survey in the seasonal, monthly, and storm analyses. Results provide knowledge and basic information concerning the spatial and temporal distribution characteristics of precipitation. This is needed in various endeavors, such as hydrologic studies, weather modification experiments, and agricultural research.

PB80-139298 PC **A03**/MF **A01**
San Jose State Univ., CA. Dept. of Meteorology.
Observational Program for Air Pollution Models.
Final rept.,
Peter F. Lester. Apr 79, 27p ARB-R/79-101
Contract ARB-A7-180-30

PIBAL winds and aircraft soundings of temperature, moisture, oxidant, and particulates were gathered at several locations in the San Francisco Bay area and in the Northern Salinas Valley during the period July 31 through August 17, 1978. The observational program was conducted during MABLES WC, an extensive field study of the marine boundary layer. The design of the experiment, schedule of observations and resulting data are described in the present report.

PB80-140783 PC **A06**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Modeling Wind Distributions Over Complex Terrain,
Mark A. Yocke, and Mei-Kao Liu. Oct 79, 122p EPA-600/4-79-066
Contract EPA-68-02-2446
See also report dated Mar 77, PB-268 642.

Accurate determination of wind fields is a prerequisite for successful air quality modeling. Thus, there is an increasing demand for objective techniques for analyzing and predicting wind distribution, particularly over rugged terrain, where the wind patterns are not only more complex, but also more difficult to characterize experimentally. This report describes the development of a three-dimensional wind model for rugged terrain based on mass continuity. The model is composed of several horizontal layers of variable thicknesses. For each layer, a Poisson equation is written with the wind convergence as the forcing function. Many types of wind perturbations over rugged terrain are considered in this model, including diversion of the flow due to topographical effects, modification of wind profiles due to boundary layer frictional effects, convergence of the flow due to urban heat island effects, and mountain and valley winds due to thermal effects. Wind data collected during a comprehensive

field measurement program at Phoenix, Arizona, were used to test the model.

PB80-141609 PC **A08**/MF **A01**
Wyoming Univ., Laramie. Dept. of Atmospheric Science.
Cloud Physics Studies in Utah during 1978.
Annual rept.,
John D. Marwitz, and Ronald E. Stewart. Oct 78, 167p AS122
Contract DI-7-07-93-V0001

The Division of Water Resources of the State of Utah conducted an operational snow augmentation project during the 1977-78 winter season. The seeding was primarily by means of acetone ground generators which released about 6 gm/hr of AgI. The generators were primarily located on either side of the north-south oriented Wasatch Range and around all sides of the east-west oriented Uinta Range in northeastern Utah. The Department of Atmospheric Science at the University of Wyoming operated its King Air in the Utah Weather Modification Program from 8 March 1978 to 7 April 1978. The objective of the research flights was to study the precipitation processes on both the Uinta Range and the Wasatch Range to determine whether a seeding potential exists, and if one does exist to determine whether the operational seeding program was effectively seeding these storms. During the field season four storms were studied. Nine flights were flown over the Uinta Range and four flights were flown over the Wasatch Range.

PB80-145055 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Atmospheric Programs Office.
Weather Modification Reporting Program, 1973-1978. Part I: Summary of Weather Modification Activities for Calendar Years 1976, 1977 and 1978. Part II: Comparison of Data Reported Since 1973,
Mason T. Charak. Jun 79, 78p NOAA-79110702

Part I of this report is a summary of reported weather modification activities for calendar years 1976, 1977, and 1978. Information presented on the reported weather modification projects includes purposes, locations, sponsors, operators, equipment, techniques, target areas, seeding agents, seeding duration, operational considerations, and environmental factors. In Part II, some adjusted data from published summaries of activities for 1973-75 are compared with the data for Part I.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A079 599/7 PC **A03**/MF **A01**
Naval War Coll Newport RI
Pricing Ourselves out of the Market: The Attack Submarine Program.
Research paper,
Linton F. Brook. 27 Jun 79, 47p

Present high costs of nuclear attack submarines have led to reduced procurement rates and will lead to significantly reduced force levels in the 1990's. The paper examines the impact of these reduced levels in order to suggest possible steps to mitigate their severity. An analysis is first made of possible roles for submarines under a variety of wartime scenarios; submarine employment is determined to depend more on invariant Soviet naval missions than on the precise nature of a future war. The interaction of U.S. submarine capabilities and Soviet Navy missions suggests the most important use of submarines is in anti-submarine warfare, both for sea control and for protection of carrier power projection forces. Dealing with the projected decrease in submarine force levels by reducing missions, improving effectiveness of existing forces and building more submarines are each examined; the examination suggests that no totally satisfactory solution exists given the probability of continued austere shipbuilding budgets. The analysis concludes that a mixed approach including procurement of less expensive (and less capable) nuclear submarines after 1985, extension of service life of some existing submarines, and various other steps is required to maintain submarine warfare capabilities. (Author)

AD-A079 777/9 MF **A01**
Management and Technical Services Co Philadelphia PA
Logic Tree Troubleshooting Aids: Organizational and Intermediate Maintenance.
Final rept.,
Joseph F. Mulligan. Jan 80, 117p AFHRL-TR-79-49
Contract F33615-78-C-0015
Availability: Microfiche copies only.

This report provides a draft military specification for use in the procurement of Logic Tree Troubleshooting Aids (LTTAs). Recent research has demonstrated that the use of LTTAs can significantly improve the efficiency and effectiveness of maintenance personnel in performing troubleshooting tasks. The use of LTTAs results in quicker location of faults and reduced consumption of spare parts. However, at present there is no specification available for the procurement of LTTAs. The draft specification was developed to fill this need. A thorough review of the state of the art in preparing and using LTTAs was made to provide the basis for developing the draft specification. This was accomplished by reviewing available literature and then conducting extensive interviews with government and industry personnel with experience in developing, using, and evaluating LTTAs. The results of the interviews were analyzed to provide the basis for establishing the requirements for developing LTTAs. The goal was to develop a specification which establishes basic requirements for developing LTTAs which will result in improved performance while still providing enough flexibility to be suitable for application to a wide variety of applications. The draft specification provides specific and general requirements for the development of LTTAs. These include requirements for (a) task analysis, (b) development of troubleshooting procedures, (c) development of checkout procedures, (d) presentation formats, (e) preliminary information, (f) supplemental and support information (wiring diagrams, theory of operation, etc.), (g) varying levels of enrichment, and (h) dual level presentation.

AD-A079 804/1 Not available NTIS
General Accounting Office Washington DC Procurement and Systems Acquisition Div
The Air Force Should Recover Excess Costs of Prior F-15 Contracts and Take Action to Save Costs on Future F-15 Contracts.
24 Oct 79, 31p Rept no. GAO/PSAD-80-4
Availability: U.S. General Accounting Office, Distribution Section, Room 1518, 441 G. St. Washington, DC 20548 (No copies furnished by DTIC).

In reviewing production material costs proposed by the McDonnell Douglas Corporation, St. Louis, Missouri, we found that the target cost of contract F33657-77-C-0200 is overstated by about $2.4 million because the contractor did not use current, accurate, and complete cost or pricing data to negotiate production material costs. Also, since the contractor's profit was added to this overstatement, about $2.7 million excess cost to the Government will result.

AD-A080 089/6 PC **A04**/MF **A01**
Analytic Sciences Corp Arlington VA
Modeling Navy Ship Acquisition.
Final rept. on Phase 2, part 1,
William J. Towle, David H. Moore, and Mike J. O'Brien. Dec 79, 73p Rept no. TASC-TR-1337-2
Contract N00014-78-C-0436

During the first phase of this contract, TASC performed a preliminary analysis of the cost and feasibility of developing a model to aid in achieving an efficient work load distribution in the shipbuilding industry through competitive allocation. This included a detailed investigation of the planning and procurement methods currently used by the Navy as well as considering the feasibility of developing an analytic tool to aid the Navy in achieving an efficient work load distribution in the shipbuilding industry. The present study provides continuing background analyses to refine the equation set, to improve the validity of the analytic approach, and to demonstrate the feasibility of the data requirement for the model. Background analyses were performed on: (1) The extent of planning problems which result from government furnished equipment, subcontracts and material; (2) The influence of government procurement strategy and contract form on the price and competitive relationships; and (3) The importance of commercial production and repair and conversion with a view to proper incorporation of these effects in the model for Navy planning purposes; and (4) Competition in the industry.

PB80-120504 PC **A08**/MF **A01**
North Carolina State Univ. at Raleigh. School of Engineering.
Furniture R and D Applications Institute.
Rept. for 1973-78,
John A. Ekwall. 1979, 157p NSF/RA-790262

Results of a five-year joint industrial-academic research and development program in the furniture manufacturing industry are reported. Established as the Furniture Research and Development Applications Institute centered at North Carolina State University, the Institute investigated (1) the efficacy of stimulating a mutually profitable industry-university R & D applications organization, and (2) the relative effectiveness of various methods of implementing and catalyzing innovation by the furniture industry. The Institute conducted 15 projects involving practical and theoretical approaches to a wide range of industry concerns involving products, processes, materials, and methods. Individual projects comprised the Clark chair frame, upholstery frame innovations, finger-jointing, robots in furniture finishing, a quality control manual, plymate joint reinforcement, moisture cycling of dowel joints, molder yield study, materials handling, lumber drying and yield, short-term problem solving, equipment file, production control workshops, operator training surveys, and carve-emboss. The organization of the Institute is described together with problems faced in relating to the furniture industry. Results achieved and methods of communicating with the furniture industry and of dealing with external factors are detailed. An extensive appendix elaborates on the text.

PB80-127517 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Implementation of Federal Policy on Acquiring and Distributing Commercial Products Is Faltering Badly.
Report to the Congress.
14 Jan 80, 58p PSAD-80-13

Federal policy requires agencies to rely on commercial products and distribution channels to meet their needs for products and services. In reviewing the progress of several agencies and interagency committees to carry out the policy, GAO found that little meaningful progress had been made. The Defense Department lacks a unified approach, and many necessary changes have not been made. The General Services Administration is lagging, and the Veterans Administration has not completed its assigned tasks. The interagency committees have achieved some policy benefits. However, unless the individual Federal supply agency pursues the policy's objectives, cost savings and other benefits will not be achieved.

PB80-127897 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Claims Div.
Unresolved Issues Impede Federal Debt Collection Efforts--A Status Report.
Report to the Congress.
15 Jan 80, 25p CD-80-1

Federal Government debt collection is not keeping pace with the increasing number of debts. U.S. citizens and organizations owed over $95 billion at the start of fiscal year 1979. Estimates from some Federal agencies show that at least $3.5 billion will be written off as uncollectible. Losses, however, will probably be greater because not all agencies have reported such data. GAO has made a number of reviews of debt collection and found that Federal efforts often were not aggressive and that collection methods were expensive, slow, and ineffective. GAO initiated revisions to the Federal Claims Collection Standards to strengthen collection efforts. However, intragovernmental disagree-

ments over several issues are impeding efforts to implement these standards and legislation may be needed to finally resolve them.

PB80-131634 PC **A03**/MF **A01**
American Association of Community and Junior Colleges, Washington, DC.
Community Colleges and Appropriate Technology.
1979, 36p NSF/RA-790265
Contract NSF-79-SP0851

In the report, appropriate technology is defined as alternate, intermediate, small-scale, light-capital, and neighborhood technology. Appropriate technology places a high priority on local needs, resources, skills, and benefits. Because of their strong community base, community colleges are in an ideal position to capitalize on this local orientation. Appropriate technology places heavy emphasis on practicality, on developing and employing useful tools to do constructive work. Some avenues for community college involvement in appropriate technology are: job training; hands-on workshops; public education; resource centers; demonstration sites; research, and appropriate technology entrepreneurship. Two strategies for launching appropriate technology programs are characterized as the add-on approach, involving tacking on individual courses or projects wherever there is a need or opportunity, and the institutional approach, entailing a far more systematic effort involving the entire college and the local community.

PB80-133234 PC **A03**/MF **A01**
Price Waterhouse and Co., Washington, DC.
General Administrative Services Costing Methodology. Review of Existing Costing Procedures. Volume I. Executive Summary with Preliminary Interpretive Comments.
Final rept.,
J. H. Whelan, and P. M. Keller. May 79, 45p
FRA-OPPD-79-14
Contract DOT-FR-75167

The report summarizes significant railroad industry practices relating to evaluating and controlling general administrative costs which were observed during visits to five railroads. Included in the report are preliminary interpretive comments concerning related costing procedures and methodologies. The observations and thoughts provided in this report will be further synthesized in a subsequent report which will address improved costing procedures and methodologies for G&A.

PB80-134265 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Applied Technology.
A Methodology for Testing Life-Cycle Performance of Consumer Products.
Final rept.,
Julius Cohen. Aug 76, 46p NBSIR-76-1157

Life-cycle performance testing of consumer products attempts to predict a probable useful life and to assess the performance during that time duration. A methodology--working cocepts, terminology, rules, and procedures--to help accomplish this aim is presented. A glossary and an annotated bibliography are included.

PB80-134299 PC **A04**/MF **A01**
Farmers Home Administration, Washington, DC.
A Study of the Effectiveness of the FmHA Water and Waste Disposal 'Modified One Percent Rule' in the Grant Determination Process.
Final rept.,
Gary L. Smith. 23 Aug 79, 69p
Prepared by American Univ., Washington, DC.

The report evaluates the effectiveness of the Farmers Home Administration (FmHA) 'Water and Waste Disposal Modified One Percent Rule' in directing grant funds to low-income communities to achieve a debt service requirement for a water and/or sewer facility which is more closely related to their ability to pay. This rule is one of five constraints of the grant eligibility determination process and became effective 3-31-78 replacing the Flat One Percent Rule. Based on a sample of grants allowed in FY 78, the rule change did not appear to bring about any significant desired effect of directing grant funds. Since the 'One Percent Rule' was overridden by one of four other constraints of the grant determination process in most cases, several rule modifications were outlined in this study for further consideration which may help achieve agency goals.

PB80-135411 PC **A03**/MF **A01**
American Council on Education, Washington, DC. Higher Education Panel.
Shared Use of Scientific Equipment at Colleges and Universities, Fall 1978.
Final rept.,
Frank J. Atelsek, and Irene L. Gomberg. Nov 79, 39p HEP-44
Grant NSF-SRS78-16385
Sponsored in part by Office of Education, Washington, DC., and National Endowment for the Humanities, Washington, DC.

The report, based on the findings of a survey of 676 institutions details information about the kinds of formal and informal procedures colleges and universities follow to facilitate sharing of scientific equipment. Descriptive characteristics of the sharing system in use during fall 1978 included: (1) the length of time the systems have been operating; (2) the total value of the equipment incorporated into the system; (3) the minimum value for inclusion of an item in the system; (4) the descriptive elements included in cataloging the items of equipment; (5) the types of records used in operation of the system; (6) the administrative level which maintains the system; and (7) provisions for updating information held within the system. Survey respondents were asked about some of the other means by which sharing took place and duplicate equipment purchases were avoided, and about the degree to which equipment sharing occurred outside the framework of any formal system.

PB80-136864 PC **A04**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC. Government Finance Research Center.
State Roles in Local Government Financial Management: A Comparative Analysis.
John E. Petersen, C. Wayne Stallings, and Catherine Lavigne Spain. Jun 79, 68p HUD-0000812

This document is the first of two which report the role of States in local government financial management. In this volume, findings from nine sample States are summarized and analyzed, and general conclusions are developed about the factors which affect the character and effectiveness of State involvement. Data obtained from on - site discussions with State and local officials and from local financial reports are integrated and used to develop methods by which the States may exercise their oversight and regulatory capacity for local finance. Seven specific areas of management are examined: accounting, budgeting, debt management, property tax assessment, revenue, pensions, and cash management. The effectiveness of any State's involvement in local finance must be a direct function of the particular conditions that exist in the State. It is not possible, therefore, to draw conclusions of universal applicability. Conclusions can be made concerning how States perform their chosen functions and the effectiveness of their management methods. Specific discussion of the methods used in California, Minnesota, Montana, New Jersey, Pennsylvania, Rhode Island, Tennessee, Texas, and Washington is provided. For these nine States, a high level of State involvement in local finance was inversely correlated with the degree of urban concentration, but there was no consistent relationship between the degree of program funding partnership and the level of State involvement. The research methodology is appended.

PB80-136872 PC **A17**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC. Government Finance Research Center.
State Roles in Local Government Financial Management: Nine Case Studies.
John E. Petersen, C. Wayne Stallings, and Catherine Lavigne Spain. 1979, 376p HUD-0000813

The second of two reports on the role of States in local government financial management contains some of the material and background information used to prepare the analysis of financial management in nine sample States. Detailed case studies are provided for programs in California, Minnesota, Montana, New Jersey, Pennsylvania, Rhode Island, Tennessee, Texas, and Washington. Conditions in each State are discussed in a commentary on the nature of State involvement. Specific areas of involvement that were studied include accounting, budgeting, debt management, cash management, property tax administration, and nonproperty tax administration. Tabular data indicate the number and population size of local governments compared to the national average and the scope of State regulation of local finance. Key legal provisions of each State's laws governing auditing and financial reporting are outlined. Selected local and State fiscal statistics are provided. Appended materials present specific statutory citations, list persons who were interviewed for the study, present the instrument that was developed by the study team, and contain the text of a report prepared by the study team on the nature of accounting, auditing, and financial reporting in the six base States.

PB80-137110 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Financial Management Capacity Sharing Program.
Sep 79, 13p HUD-0000970

The Financial Management Capacity Sharing Program has assembled a variety of successful methods for managing local government finances and makes them available through conferences, workshops, publications, networks, and telephone inquiry services. They involve local, State, and Federal program activities. This guide describes each activity, identifies the sponsor, and lists names and telephone numbers of contact persons. Current projects designed to help local governments share, adapt, and use modern financial management practices include (1) the Financial Management Resource Center, the national contact for technical support; (2) the Trainers Resource Exchange, a clearinghouse for financial management trainers and assistance providers; (3) regional workshops for urban managers; (4) exemplary practices and workshops conducted by the International City Management Association; (5) networks for local officials; (6) Financial Management Digest and other publications; and (7) national conferences. Current projects to remove State barriers to local government use of modern financial management practices include (1) ten case studies and an overview on the role of Departments of Commmunity Affairs in providing local financial management assistance produced and disseminated by the Council of Community Affairs Agencies; (2) the Municipal Finance Officers project on State role in local financial management; (3) a survey of users of State and local financial reports by the Council of State Governments; and others. The Federal strategy in aiding local financial management is to reduce pressure on local governments by encouraging streamlined Federal grant requirements and supporting a conceptual framework and modern standards for structuring generally accepted accounting principles for localities.

PB80-137656 PC **A02**/MF **A01**
Moore McCormack Lines, Inc., Stamford, CT.
The Purchasing, Inventory and Cost Control System (PICCS).
Executive summary Sep 76-Aug 79,
Vincent Fiorenza. Aug 79, 16p MA-RD-93080026
Contract MA-7-38063

The report describes the development and use by Moore McCormack Lines of a computerized system (PICCS) to assist in performing the functions of purchasing, inventory, and cost control. For the most part, these functions were previously performed manually. Each of the PICCS subsystems are described as well as how the system provides the required services to its user organizations. Under the provisions of Moore McCormack Lines contract with the Maritime Administration, the computer programs and detailed documentation are available to any U.S.-flag operator for a nominal one-time royalty fee.

PB80-137664 PC A06/MF A01
George Washington Univ., Washington, DC.
The Meaning of Patent Statistics.
Final rept.,
L. James Harris, Mary A. Holman, Edmund W. Kitch, and Keith Pavitt. Dec 79, 107p NSF-SIU-79-1
Prepared in cooperation with Chicago Univ., IL., and Sussex Univ., Brighton (England).

The report consists of four papers written as background for the preparation of Science Indicators--1978. Four experts in the legal and economic aspects of patenting discuss the strengths and weaknesses of patent counts as measures of levels of technical invention and suggest longer-range studies that would provide more insight into the meaning of patent data.

PB80-137672 PC A07/MF A01
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Funding for Highway Safety Research, Development, and Demonstration in the National Highway Traffic Safety Administration.
Final rept. Jul 78-Nov 79,
Thomas C. Anderson. Nov 79, 132p UM-HSRI-79-88
Sponsored in part by Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, MI.

The report presents the results of a study examining the National Highway Traffic Safety Administration's (NHTSA) allocation of resources to highway safety research, development, and demonstration programs (RD and D). The allocation of financial resources to this area is examined for the 1970-1979 time period, and additional analysis is made of the allocation of 403 contract expenditures in NHTSA's proposed 1980-1984 plan.

PB80-137680 PC A02/MF A01
Peat, Marwick, Mitchell and Co., Washington, DC.
Financial Information and Retrieval System (FIRST). Executive Summary.
Final rept. Jul 75-Dec 78,
Neal Liveakos. Dec 78, 18p MA-RD-930-80022

The purpose of the report is to present an executive summary of the concepts and capabilities of the Financial Information and Retrieval System (FIRST). The project was sponsored by the Shipping Operations Information System (SOIS) Program of MarAd. The major development phases included: (1) requirements definition, feasibility assessment, and conceptual design; (2) detail system design; and (3) system development. The FIRST system has been successfully and extensively exercised in a test prototype environment at MarAd. Full production mode operation of the system began in December 1978.

PB80-138001 PC A02/MF A01
National Transportation Policy Study Commission, Washington, DC.
Regional Transportation Needs Concepts.
Working paper,
Arthur L. Webster. Dec 79, 17p NTPSC/WP-79/26

The paper discusses the definition of the term 'transportation needs;' it examines past definitions as they are stated or implied in Federal studies and reports, and suggests a new definition which may be more useful in guiding Federal planning and investment in transportation facilities.

PB80-138506 PC A02/MF A01
North Carolina Univ. at Chapel Hill. Inst. for Research in Social Science.
American State Administrators Project: Survey and Tabulations,
Dell S. Wright. 1975, 9p NSF-RA-S-75-124

In mid-1974 the American State Administrators Project (ASAP) sent questionnaires which dealt with General Revenue Sharing (GRS), to the heads of 68 types of state departments and agencies. Out of a total of 2,909 questionnaires which were sent, there were 1,581 usable replies, a nationwide response rate of 54%. The survey included 108 questions. The replies to a majority of those questions are tabulated in the publication.

PB80-138647 PC A05/MF A01
AIA Research Corp., Washington, DC.
User Needs Research Practices of Designers. Environmental Design Reseach, Problems and Needs,
Mary Helen Lorenz. 15 Nov 78, 97p NSF/RA-780712
Grant NSF-OPA78-20997
Prepared in cooperation with Skidmore, Owings, and Merrill, Boston, MA.

The current state of user needs research and applications by practicing design professionals is documented, and potential user needs research areas for the proposed environmental design research program are described. Selected designers and their staffs were interviewed on practices, problems, and attitudes in applying user needs research. Each interview focused on one or two projects which have utilized such research. Interview findings were analyzed and reduced to a summary of key issues and problems and a listing of potential research areas for NSF funding. Study results show that the infrequent application of user needs research can be traced to these causes: (1) Little relevant research exists on people in their environments; (2) Traditional design practice has not easily integrated such research; and (3) The field is not recognized by most designers, clients, or researchers as a normal professional service.

PB80-138852 PC A03/MF A01
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
The Joint Tactical Information Distribution System--How Important Is It.
Report to the Congress.
30 Jan 80, 46p PSAD-80-22

The Joint Tactical Information Distribution System is being designed to counter the existing electronic countermeasures threat to U.S. communications by Warsaw Pact forces. Development of the system has been given a high priority, but management has been ineffective and progress slow. Problems similar to ones cited in a February 1979 GAO report continue to exist, and recent actions by the Office of the Secretary of Defense and the Air Force to reduce its cost effectiveness and military worth raise questions as to whether the need for the system is as critical as indicated by the Department of Defense.

PB80-138886 PC A03/MF A01
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
The Navy's Inspection System Could Be Improved.
Report to the Chairman, Subcommittee on Legislation and National Security, House Committee on Government Operations.
26 Dec 79, 45p FGMSD-80-23

The Naval Inspector General inspection system is much smaller than the Air Force or the Army systems, and covers only about 20 percent of the Navy's activities; the other activities are inspected by individual commanders. While this tiered system has minimized duplication, it has also prevented lower level problems from reaching the Navy headquarters Inspector General. If headquarters expanded its inspections and used civilians more often to fill professional positions, the system would be stronger. Headquarters and some major command inspection reports are valuable, but they can be improved by (1) developing more information on the underlying causes of problems disclosed during inspections and (2) eliminating reports of minor, non-mission-related deficiencies.

PB80-138969 PC A04/MF A01
Iowa State Office for Planning and Programming, Des Moines.
The Iowa Science, Engineering, and Technology Project: A Study to Identify the Means by Which the Executive Branch of State Government Can Improve Its Capability for Using Science, Engineering, and Technology in Meeting the Needs of the Citizens of Iowa.
Final rept.,
Robert W. Hanson. Feb 79, 52p NSF/RA-790318
Contract NSF-ISP77-25351

The report of the Iowa State Science, Engineering, and Technology (SSET) project describes the work of a task force commissioned to improve access of the Governor and government agencies to scientific and technological information. The study addresses two questions: (1) To what extent would a better understanding of scientific and technological concepts improve the ability of elected or appointed public officials to make policy decisions: and (2) To what extent would a specific science and technology information system be a significant addition to information resources currently available to policy makers.

PB80-139025 PC A03/MF A01
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
The Defense Logistics Agency Inspector General Inspections Should Change From A Compliance To A Systems Approach.
Report to the House Committee on Government Operations.
27 Dec 79, 39p FGMSD-80-24

The Inspector General's reports contain some information that would be useful to Department of Defense and congressional decisionmakers. The reports also provide information on how subordinate units comply with regulations and directives. However, the effectiveness of these inspections could be improved by reducing reporting of minor deficiencies and shifting inspection emphasis, as the Air Force and Army Inspectors General are attempting to do, to identifying and reporting causes of significant problems. The potential for fraud, waste, and abuse at Defense Logistics Agency functions, coupled with the decrease of audit coverage of these activities, further dictates the need for the Inspector General to modify his inspection approach. He also should attempt to achieve the annual inspection coverage desired by the Agency Director by using additional temporary inspectors.

PB80-139082 PC A03/MF A01
General Accounting Office, Washington, DC. General Government Div.
Audit of The Federal Financing Bank For The Year Ended September 30, 1979.
Report to the Congress.
6 Feb 80, 27p GGD-80-30

The enclosed financial statements present fairly the financial position of the Federal Financing Bank at September 30, 1979. Reported results of operations and changes in financial position during fiscal year 1979 conform with Comptroller General accounting principles applied consistently except for one change which has the consent of the GAO.

PB80-139371 PC A04/MF A01
Indiana Univ. at Bloomington.
Reference Source on Soviet R and D Statistics, 1950-1978,
Robert W. Campbell. 1978, 54p
Contract NSF-78-SP-1023

The document contains data on Soviet expenditures for research and development, scientific and technical personnel, and the gross national product. It also contains a discussion of the methodologies used for determining these figures and the conversion of the ruble figures into U.S. dollars and identifies the reference sources utilized. The document updates and replaces a 1976 version by adding more recent data and corrects preliminary data for earlier years. It employs a different and more refined methodology for adjusting Soviet scientific personnel data to the NSF concept of scientists and engineers employed in research and development.

PB80-139389 PC A05/MF A01
Florida Div. of State Planning, Tallahassee.
Science, Engineering, Technology and Florida's Government,
Joseph H. Gerry, and Malcolm P. Thomas. Apr 79, 99p NSF/RA-790311
Grant NSF-ISP78-05131

The report is part of a project to examine the structure and process of Florida's executive branch in relation to science, engineering, and technology (SET), to determine a strategy to facilitate improvements in the way state resources are used in SET endeavors, and specifically, to provide assistance in the improvement of the policy formation process within Florida. The body of the report con-

sists of seven sections: an organizational profile of Florida's executive branch; a review of the overall relationship of the State Comprehensive Plan to SET; a synthesis of significant observations from respondents participating in interviews and survey questionnaires; an overview of the activities of other states including findings to be considered for Florida's improvement in SET; the author's analysis of considerations affecting Florida's utilization of and relationship with SET; development of strategic requirements and a proposal for an organizational structure for Florida; and conclusions. Included in the appendices are a project description and an overview of the development of SET in the United States.

PB80-139546 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Increased Standardization Would Reduce Costs of Ground Support Equipment for Military Aircraft.
Report to the Congress.
7 Feb 80, 65p LCD-80-30

Substantial savings could be realized if military aircraft ground support equipment could service more than one aircraft. The Department of Defense needs to emphasize standardization of this equipment and improve systems for reducing duplication of equipment. The Department should seek to provide incentives to contractors to use existing aircraft support equipment in the design of new weapon systems.

PB80-139645 PC **A08**/MF **A01**
Center for Governmental Research, Inc., Rochester, NY.
The AFDC (Aid to Families with Dependent Children) Formula: Distributional and Equalization Effects of the AFDC Formula and AFDC Formula Alternatives.
Working paper,
Friedrich J. Grasberger, and Jeffrey O. Smith.
Dec 78, 175p WP-1, NSF/RA-780637
Grant NSF-APR77-15726

The paper presents an analysis of the distributional and equalization effects of the present and alternative formulas for the determination of Federal matching grants for the AFDC grant-in-aid program. It contains a synoptic review of background information focusing on the existing AFDC formulas, a brief discussion of major formula issues, a description of the frameworks utilized in the analysis of present and alternative formulas, and several series of tables and maps depicting the effects of various formula modifications. The analyses show that significant improvements in the equalization power of the Federal AFDC grant-in-aid program can be attained by substituting income per need unit for the present per capita income formula element, and by eliminating the dual formula system, the income squaring feature, and the upper and lower limit formula constraints.

PB80-139652 PC **A07**/MF **A01**
AIA Research Corp., Washington, DC.
Social Impact Assessment and Environmental Design (Environmental Design Research - Problems and Needs).
C. P. Wolf. 14 Nov 78, 143p NSF/RA-780711
Grant NSF-OPA78-20997
Prepared in cooperation with City Univ. of New York. Environmental Psychology Program.

The study was designed to develop a rationale for funding social impact assessment (SIA) of public programs and policies as part of an NSF-sponsored program of environmental design research. It addresses potential contributions of SIA to the solution of environmental design problems, and reviews SIA as it intersects with environmental design interests. Socio-political, economic, and ecological consequences related to large-scale applications of high technology are discussed. The field of SIA was described from the standpoint of its objectives and the resistances encountered in achieving them. Other problems included the lack of interest by policy makers in SIA, the difficulties of evaluating advantages and disadvantages of numerous social science methodologies, and bridging the gap between SIA research and practice so as to solve individual situations. The report concludes with a brief review of cognate programs in which SIA-type work is funded by NSF and the importance of institutional support. Extensive tables, exhibits, and references are included.

PB80-139728 PC **A03**/MF **A01**
Rhode Island Executive State Science, Engineering and Technology Project, Providence.
Rhode Island SSET (State Science, Engineering and Technology) Report.
Final rept.,
Glenn Kumekawa, and Robin Reenstra. May 79, 45p NSF/RA-790315
Grant NSF-ISP78-02499
Prepared in cooperation with Rhode Island Univ., Kingston. See also PB80-139736.

The Rhode Island Executive State Science, Engineering, and Technology (SSET) Project has undertaken an evaluation of the Governor's policy staff's need for science and technology (S & T) information. A review of the functions carried out by the policy staff and of their information requirements suggests that a direct linkage is not appropriate. Instead, policy analysts should have direct access to contact individuals within research organizations who can identify the appropriate specialists for a given topic. Examples of untapped resources are reviewed in this report, as are a set of procedural guidelines for identifying information, organizing information requests, identifying appropriate specialists, and insuring relevance of the response. A breakdown of the Governor's policy office is diagrammed as is the proposed path of external information retrieval by the state government. Other topics covered include: other states' approaches to S & T information needs; existing information flow; accessibility of S & T information; case studies; a computer-based analysis of land management options; big river development; and a summary review of findings.

PB80-139736 PC **A06**/MF **A01**
Rhode Island Executive State Science, Engineering and Technology Project, Providence.
Identification of Rhode Island and Northeast Area Scientific and Technical Resources. Appendix.
1979, 118p NSF/RA-790316
Grant NSF-ISP78-02499
Prepared in cooperation with Rhode Island Univ., Kingston. See also PB80-139728.

The directory aims to facilitate the way in which science and technology (S & T) resources of the State of Rhode Island and of the Northeast area are used. A bibliography of University of Rhode Island (URI) faculty experts in environmental energy, transportation, economics, labor relations, health, and social services is provided. URI research and information centers are identified and their services are listed. These fields are covered: coastal and water resources; business; economics; ocean management; agricultural experimentation; government research; scientific criminal investigation; marine resource development; poison control; curriculum research and development; drug information service; gerontology; oil spills; and psychological consultation. Also included is a list of contact people at New England-based Federal R & D laboratories, a list of national professional associations, members of the URI faculty, and a summary of ongoing research at URI.

PB80-139769 PC **A16**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Long-Term Care Case Mix Compared to Direct Care Time and Costs. Final Report and Executive Summary.
Rept. for 30 Sep 76-31 May 79,
Kenneth M. McCaffree, Jean Baker, and Edward B. Perrin. 31 May 79, 372p NCHSR-80-19
Contract PHS-HRA-230-76-0285
See also report dated Mar 77, PB-264 910.

The study replicates a 1974 analysis of cost related patient characteristics. This previous study attempted to identify these resident characteristics and conditions that were best indicators of costs of services that an individual requires and to analyze how resident conditions and characteristics affect allocation of personnel time among residents. The 1974 study developed average relative time weights (ARWs) to explain the relative importance of each characteristic in determining distribution of staff contact time. The present study tests reliability of ARWs for predicting aide/orderly and licensed nursing contact time in a sample of 16 average facilities. A relatively short list of selected characteristics primarily associated with daily living activities of nursing home residents explain over fifty per cent of variation in aide/orderly contact time but only twenty-two per cent of licensed nursing contact time. Facility characteristics have little effect on contact time distribution. The analysis needs methodological refinement and larger sample sizes before use in reimbursement or staffing estimation.

PB80-139876 PC **A08**/MF **A01**
California Univ., Berkeley. Center for Planning and Development Research.
Future Research Directions in Environmental Design: An Exploration Using the Experience of University of California's College of Environmental Design.
Final rept.,
Richard Bender, and George Rand. 1 Mar 79, 158p NSF/RA-790292

The culmination of six months of exploration in the field of experimental design (ED) is reported. Research topics which were derived from a broad range of professional and research concerns are discussed and developed into a preliminary research agenda. The agenda comprises a series of editorial proposals and papers: a case analysis approach to the study of forces shaping the physical environment; integration of health and safety criteria into ED; the growth and decline of areas of human settlement; taxonomy of settings; technology transfer; building performance evaluation; futures mapping; design of regulatory systems for design; professional media--definition of research area; and research for design participation.

PB80-139892 PC **A11**/MF **A01**
AIA Research Corp., Washington, DC.
A Review of Federal Mandates Related to Environmental Design and the Quality of the Built Environment, with Implications for Environmental Design Research (Environmental Design Research, Problems and Needs).
14 Nov 78, 229p NSF/RA-780707
Grant NSF-OPA78-20997
Prepared in cooperation with Association for the Study of Man-Environment Relations, Bethesda, MD.

The study examines existing Federal documents, Congressional legislation, Presidential policies and commissions, agency policies, regulations, and guidelines, in order to identify present mandates for the establishment and operation of a program of support for environmental design research within the National Science Foundation. These documents made reference to more than 200 Federal agencies and offices within agencies and covered areas of major social and individual interest ranging from urban and rural development, through neighborhoods and housing and quality of life factors including safety, security, health, welfare, and occupational functions, and for special user groups. Study results define a clear and urgent mandate for the Federal government to take concrete action in order to upgrade present unsatisfactory physical environments and prevent the further deterioration of the built environment as a result of inappropriate building and development and continued neglect.

PB80-140890 PC **A03**/MF **A01**
California Univ., Los Angeles. School of Public Health.
Implications of Health Department/Hospital Mergers. Executive Summary of Final Report.
Final rept. 1 Jun 75-28 Feb 78,
William Shonick. 1 Jan 79, 38p NCHSR-80-21
Grant PHS-HS-01808
See also PB80-141047.

The study examines the functional reorganizations and mergers between local health departments and public hospitals which have occurred in several large urban areas as a response to the needs of the poor for better primary medical care. Four study components, each focusing on a particular aspect of the problem, are utilized to accomplish these goals. They include a literature review, survey of health department organizational set-

tings, overview of public hospitals with relation to the plight of their geographic area, and twelve site visits to study the relationship between the public health department and the public hospital. The most significant findings resulted from the site visit component. It was found that two primary motivating forces stimulated the mergers; inner city problems and a desire to improve local government efficiency. Principal aims of the mergers were to improve medical care through institution of a comprehensive integrated system, improve local governance and reduce red tape. In terms of merger outcomes, without the infusion of large scale additional funds, no substantial expansion of medical care was realized. Further, the effect of mergers upon management efficiency was not clearly demonstrated and no substantial efficiencies in health services operations were achieved.

PB80-141047 PC **A11**/MF **A01**
California Univ., Los Angeles. School of Public Health.
Implications of Health Department/Hospital Mergers. Final Report.
Final rept. 1 Jun 75-28 Feb 78,
William Shonick. 1 Jan 79, 231p NCHSR-80-22
Grant PHS-HS-01808
See also PB80-140890.

Contents:
Motivation for this research;
Overview of the study;
Description and results of each component;
Summary and conclusions;
Policy implications.

PB80-142417 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Architecture and Urban Studies.
National Science Foundation Agenda, Environmental Design Research. Program Recommendations,
D. Kilper. 1979, 107p NSF/RA-790289

The project attempts to define the field of environmental design, the state-of-the-art in environmental design research, and an environmental design research agenda. The study specifically addresses professional implications and special rural needs of environmental design research. The project was conducted by 20 university faculty members in group discussions and via questionnaires. The report deals with emerging paradigms in environmental design research for design, research of design, research by design, design research for rural areas, and protocol.

PB80-143142 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. General Government Div.
Federal Supervision of Bank Holding Companies Needs Better, More Formalized Coordination.
Report to the Congress.
12 Feb 80, 48p GGD-80-20

The three Federal banking regulatory agencies must better coordinate their efforts to supervise bank holding companies, which control almost three-fourths of all banking assets in the United States. Not supervising the companies as integrated units has led to problems in dealing with holding company banks in trouble. GAO recommends that the Federal Financial Institutions Examination Council establish procedures to coordinate the examinations of holding companies and their bank subsidiaries and to coordinate any supervisory actions that must be taken to help solve problems that may exist.

PB80-143191 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Improving The Productivity Of Federal Payment Centers Could Save Millions.
Report to the Congress.
12 Feb 80, 59p FGMSD-80-13

The Government can achieve high productivity in processing its vendor bills for payment but does not, primarily because most payment centers are not concerned about how or why productivity should be measured. Productivity should be a prime concern of Government managers at all levels. Their lack of concern for productivity improvements and measurement in the payment process is largely a result of the lack of incentives and the presence of strong disincentives to improve productivity. Government payment centers could save millions in labor costs by developing measures of productivity and implementing identified improvement techniques.

PB80-143217 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
National Bureau Of Standards - Answers To Congressional Concerns.
Report to the Congress.
2 Feb 80, 80p CED-80-49

The report concerns (1) problems faced by the National Bureau of Standards because of the Office of Management and Budget's implementation of the 'lead agency' concept, (2) user satisfaction with the Bureau's research efforts, (3) an evaluation of the effects of the Bureau's major reprogramming of its research efforts, and (4) information on which of the acts assigning responsibilities to the Bureau overlap, duplicate, or are in conflict with other acts and should be amended or revised.

5B. Documentation and Information Technology

AD-A079 601/1 PC **A02**/MF **A01**
Wharton School Philadelphia PA Dept of Decision Sciences
Description of the Wharton/ODA System.
Technical rept.,
David Oppenheim, James S. Ribeiro, and E. Gerald Hurst, Jr. Dec 79, 22p Rept no. 79-12-02
Contract N00014-75-C-0440

The purpose of this document is to give a brief introduction to the hardware available in the Wharton Computer Center and the Decision Aiding Systems Laboratory (DASL), and to summarize the software which has been developed at Wharton under the Operational Decision Aiding Project. More detail about most of these features is available; in particular, some of the other software developed for use on the Wharton system may be of interest to other contractors, now that the system is easily accessible via the ARPANET. (Author)

AD-A079 626/8 PC **A09**/MF **A01**
Pattern Analysis and Recognition Corp Rome NY
Advanced Query Techniques.
Final technical rept. 19 Sep 77-19 Jun 79,
Clinton P. Mah, and John M. Morris. Oct 79,
184p RADC-TR-79-260
Contract F30602-77-C-0161

The report describes an RADC sponsored R&D effort directed at providing an improved natural language access to differently formatted target databases. Section I defines functional characteristics of on-line intelligence information systems within the current state-of-the-art; describes the rationale of the AQT effort, and provides a comparison between the AQT approach and other approaches inherent in the existing information systems with a practical orientation. Section II describes basic concepts of the AQT approach (extended relational data models, intermediate query language, table driven translation). Linguistic implementation of natural language query techniques is provided in Section III. Section IV deals with the methodology of accessing differently formatted target databases. Section V describes some special problems in querying target databases (e.g., generic keys, ellipsis, purging a context, conversational postulates). Section VI constitutes a detailed description of the presently available AQT testbed system. Section VII provides criteria for evaluation of user interface languages for database management systems. Section VIII is a statement of conclusions including present status and results; operational evaluation criteria; areas for further work, plans, summary and directions.

AD-A079 711/8 PC **A04**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 33, Number 11,
Robert E. Machol, and Dodie Thomas. 30 Nov 79, 52p Rept no. ESN-33-11

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staff of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A080 041/7 PC **A05**/MF **A01**
Army Combined Arms Combat Developments Activity Fort Leavenworth KS
Document Control System Users Manual, Programmer's Manual.
Final technical rept.
Robert D. Smith, Leon D. Godfrey, and Walter J. Thomson, Jr. Dec 79, 89p Rept no. CACDA-TR-10-79

The document control system described in this report was developed for the Combat Operations Analysis Directorate of the Combined Arms Combat Development Activity, Fort Leavenworth, Kansas, to provide the Directorate with an automated system for controlling, maintaining, and locating the various classified and unclassified documents located within the Directorate. This report contains a general description of the system and the equipment used, a user's manual, and a programmer's manual. Both the system itself and the software are fairly simple and straightforward. With minor programming changes, the system could be modified to suit the needs of most research organizations.

N80-17014/5 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Fiscal Year 1979 Scientific and Technical Reports, Articles, Papers and Presentations.
O. L. White. Oct 79, 62p NASA-TM-78250

This bibliography lists approximately 590 formal NASA technical reports, papers published in technical journals, presentations by MSFC personnel, and reports of MSFC contractors introduced into the NASA scientific and technical information system in 1979.

PB80-117666 PC**$5.50**/MF **A01**
National Technical Information Service, Springfield, VA.
Appropriate Technology Information for Developing Countries: Selected Abstracts from the NTIS Data File (Second Edition),
Paul L. Bundick. Nov 79, 413p
Supersedes PB-294 160. Prepared in cooperation with Volunteers in Technical Assistance, Inc., Mt. Rainier, MD. Sponsored in part by Agency for International Development, Washington, DC.

The bibliography is an edited search of 'appropriate technology' citations from the NTIS Bibliographic Data File. Over 2000 citations with abstracts are included. Appropriate Technology has been defined, in the context of this publication, as information which can be adapted and applied to improve the quality of life of low-income groups. This does not refer to 'trickle-down' benefits but to direct benefits which foster self-reliance and a sense of dignity among the poor. The information, therefore, is broad in scope covering many fields but pertaining to one or more of the following categories: Smaller-scale technologies, Labor-intensive technologies, Low-cost technologies, Revived technologies, Improved Traditional technologies, Alternative techniques, Useful Social and Management technologies and Selected Modern technologies adapted to the local needs and environment. This Second Edition supersedes Issue Number One (PB-294 160) published in February, 1979 entitled, Selected Appropriate Technologies For Developing Countries.

16mm microfilm $58.00 or $76.00
Patent and Trademark Office, Washington, DC.

U. S. Patent Classification - Subclass Listing Including All Patents Issued Through December 25, 1979 and All Reclassifications Through December 25, 1979.
Dec 79,9 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $12.00.
Available in set of 9 16mm microfilm reels or cartridges (specify type): reel, PB80-123706-P, $58.00; 3M cartridge, PB80-123706-M, $76.00; Recordak cartridge, PB80-123706-R, $76.00; or Thread Easy magazine, PB80-123706-T, $76.00.

The publication is a listing by classes, subclasses, and digests of the classification system, the patent numbers of U.S. Patents which are classified as originals, cross references, and unofficial cross references in each subclass. The patent numbers are in numerical sequence. Other individual documents are also available:

Classes 2 thru 40, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123714**
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Classes 76 thru 130, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123730**
Classes 131 thru 188, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123748**
Classes 190 thru 235, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123755**
Classes 236 thru 264, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123763**
Classes 266 thru 328, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123771**
Classes 329 thru 417, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123789**
Classes 418 thru 585, 1 reel, $10.00, or cartridge (specify) $12.00 **PB80-123797**

16mm microfilm $124.00 or $164.00
Patent and Trademark Office, Washington, DC.

U. S. Patent Classification - Numeric Listing Including All Patents Issued Through December 25, 1979 and All Reclassifications Through December 25, 1979.
Dec 79,20 16mm microfilm reels or cartridges
Individual reels available for $10.00; individual cartridges (specify type) available for $12.00.

The publication is a listing by classes, subclasses, and digests of the classification system, the patent numbers of U.S. Patents which are classified as originals, cross references, and unofficial cross references in each subclass. The patent numbers are in numerical sequence. Other individual documents are also available:

Patent Numbers AI2-AI318, D1-D253795, PP1-PP4490, RD301-RD25414, RE1-RE30182, RX36-RX112, T856001-T989005, X1-X9900, 1-21246, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123813**
Patent Numbers 21247 thru 308602, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123821**
Patent Numbers 308603 thru 578922, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123839**
Patent Numbers 578923 thru 841604, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123847**
Patent Numbers 841605 thru 1099436, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123854**
Patent Numbers 1099437 thru 1353769, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123862**
Patent Numbers 1353770 thru 1604483, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123870**
Patent Numbers 1604484 thru 1843331, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123888**
Patent Numbers 1843332 thru 2061513, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123896**
Patent Numbers 2061514 thru 2267418, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123904**
Patent Numbers 2267419 thru 2469316, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123912**
Patent Numbers 2469317 thru 2665044, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123920**
Patent Numbers 2665045 thru 2860851, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123938**
Patent Numbers 2860852 thru 3053610, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123946**
Patent Numbers 3053611 thru 3238910, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123953**
Patent Numbers 3238911 thru 3423589, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123961**
Patent Numbers 3423590 thru 3616242, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123979**
Patent Numbers 3616243 thru 3808176, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123987**
Patent Numbers 3808177 thru 3994623, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-123995**
Patent Numbers 3994624 thru 4180866, 1 reel, $10.00 or cartridge (specify) $12.00 **PB80-124001**

PB80-130131 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
Data Base Statistics for 1977.
Final rept.,
Martha E. Williams, Scott E. Preece, and Laurence Lannom. Mar 79, 54p T-76
Grant NSF-SP77-0986

Database statistics for 1977 were generated for 'bibliographic' databases. Bibliographic databases included those that are generally understood as bibliographic (containing bibliographic citations), bibliographic-related databases (e.g., indexes which point to citations) and textual databases (e.g., legal cases, newspaper files). Statistics are provided for databases and database records contained within them. Tables include correlations relating pairs of the attributes (origin, subject, size, producer status, access mode, and start year) associated with U.S. and foreign databases and database records. Included are 366 bibliographic databases for which data had been entered into 'Database of Databases' at the University of Illinois through 1977.

PB80-130537 Not available NTIS
National Bureau of Standards, Washington, DC.
Database Reorganization -- Principles and Practice.
Final rept.,
G. H. Sockut, and R. P. Goldberg. Dec 79, 25p
Pub. in ACM Comput. Surv. 11, n4, p371-395, Dec 79.

Database reorganization can be defined as changing some aspect of the way in which a database is arranged logically and/or physically. An example is changing from a one-to-one to a one-to-many relationship. Reorganization is a necessary function in a database system. This paper introduces the basic concepts of reorganization, including why it is performed. Many types of reorganization are described and classified into logical/physical levels. Then pragmatic issues such as reorganization strategies, a survey of several commercial reorganization facilities, case studies, and database administration considerations are covered. Finally, several research efforts are surveyed.

PB80-130990 Not available NTIS
National Bureau of Standards, Washington, DC.
A Criterion for Packing Hash Tables.
Final rept.,
G. A. Lyon. May 79, 4p
Pub. in Proceedings of the Conference on Information Sciences and Systems (1979) Held at Baltimore, MD., on March 28-30, 1979, p262-265, May 79.

One can minimize worst case searches for 'open addressing' hashing while perturbing average retrieval only slightly. Applying this observation to tables with buckets provides excellent search performances. Once bucket size equals four or more records, even worst cases--occurring perhaps for a fifth of the items--should not require more than two table probes.

PB80-132939 PC **A04**/MF **A01**
Creative Socio-Medics Corp., Arlington, VA.
Study of Data Reliability and Quality Control from National Alcoholism Program Information System. Project Overview and Summary. Volume I.
Final rept.
Mar 79, 73p NIAAA-77-4-1
Contract PHS-ADM-281-77-0028

The report assesses the reliability of the NAPIS system and makes recommendations for improving the system. Overall, the NAPIS system was found to be basically reliable. Several questions on the forms resulted in low reliability and it was determined that the problems result from ambiguity or lack of definition. Other problems found were difficulty recall by clients and for several questions the refusal by the client to answer the question. Vol. 1, The Short Final Report, summarizes the background, objectives, and operations of the project and presents the conclusions and recommendations.

PB80-134752 PC **A02**/MF **A01**
Environmental Protection Agency, Chicago, IL. Office of Civil Rights and Urban Affairs.
Minority Consulting Professional Firms.
1977, 22p EPA-905/9-77-009, CRUA-77-2

The directory lists minority architectural and engineering firms which can aid municipalities, applicants and grantees in implementing a meaningful Equal Employment Opportunity policy.

PB80-137177 MF **A01**
HUD USER, Germantown, MD.
Compendium of Research Reports.
Aug 79, 207p HUD-0001038, HUD/PDR-473
Contract HUD-H-2664
Paper copy available from the Sup. of Docs., Stock number 023-000-00543-3.

HUD's Office of Policy Development and Research has produced this compendium of research reports, providing bibliographic information, abstracts, and details about availability and ordering for each of the 500 titles entered in the HUD USER automated data base as of August 1979. The table of contents, alphabetic list of documents, numeric list of documents, and list of authors assist in locating subjects of interest in the main body of the compendium. Fifty - five subject areas (e.g., assisted housing, citizen participation, condominiums, lead-based paint, social indicators, urban renewal, historic preservation, land use and zoning, and revenue sharing / block grants) are included. These sections consist of abstracts of research reports, demonstration projects, and other activities listed alphabetically by title. Each abstract details subject area, title, publication data, length of report, and source. Ordering information is also provided. Most of the reports were published between 1976 and 1978.

PB80-137938 PC **A03**/MF **A01**
Oberlin Coll., OH.
Research on the Impact of a Computerized Circulation System on the Performance of a Large College Library.
Rept. no 1, 15 Sep 78-15 Sep 79,
Virginia B. Harris, Katherine Frohmberg, and William A. Moffett. Nov 79, 50p
Grant NSF-IST78-10811

The report studies certain performance variables which change during the introduction and implementation of an automated circulation system. These variables (the quality and quantity of service and the attitude of patrons toward that service) are rarely examined in a controlled and precise environment and the analysis of them can provide significant management information for libraries. The paper examines the testing of two hypotheses, and suggests a basis for determining how best to improve service to users, and offers research data to the library community as a foundation for further work.

PB80-144272 PC **A10**/MF **A01**
Executive Office of the President, Washington, DC. Information Management and Services Div.
EOP Manual of Preferred Style.
1979, 203p EOP/08-79/1001

The manual presents editorial specifications for manuscripts prepared by or for agencies of the Ex-

ecutive Office of the President (EOP). It is not intended to supplant standard formats used in regular publications such as the federal budget. Areas addressed in the manual include capitalization, spelling and word division, punctuation, the use of numbers, quotations, tables and illustrations, footnotes and bibliographies, and typing guidelines. The manual contains an annotated bibliography, index, and samples of correctly typed manuscript pages.

PB80-147440 PC **A11**/MF **A01**
Arizona State Univ., Tempe. Coll. of Engineering and Applied Sciences.
Resource Catalogue of Selected Scientific and Technical Expertise in Arizona (Organized by Subject Areas),
William E. Lewis, and William C. Moor. 31 May 79, 244p NSF/RA-790321
Grant NSF-ISP78-04612
Prepared in cooperation with Arizona State Legislature, Phoenix.

The directory lists Arizona resource personnel and is organized in thirty-five subject categories and sub-categories. Individuals are identified by name, title, professional affiliation, address, and phone number. The specific major categories are as follows: problem solving for state and local government, health planning and communication, physics, ocean technology and engineering, natural resources and earth sciences, electrotechnology, civil engineering, aeronautics and aerodynamics, astronomy and astrophysics, atmospheric sciences, medicine and biology, computers, detection and counter measures, environment, administration, materials science, mathematical sciences, military sciences, missile technology, navigation, nuclear science and technology, ordnance, propulsion and propellants, photography and recording devices, space technology, transportation, library and information services, building industry technology, government inventions and licensing, urban and regional technology and development, behavior and society, NASA earth resources and survey program, industrial and mechanical engineering, biomedical technology, business and economics, energy, agriculture and food, and chemistry.

PB80-148687 MF **A01**
Association for the Study of Man-Environment Relations, Inc., Orangeburg, NY.
Online Information Retrieval Pertinent to Human Health and Well-Being in the Built Environment, An Exploration of Seven Online Files,
Patrick E. Heinig, and D. Michael Murtha. 25 May 79, 99p
Contract PHS-278-77-0055
See also report dated May 79, PB80-103070.
Available in microfiche only because of poor quality.

Seven on-line databases (available through the Lockheed DIALOG on-line information service) were reviewed in addition to the NLM databases, to discover the potential of other databases for providing information relevant to human-environment relations and environmental design. A complete summary of all search strategies tried for each file and the resultant output retrieved are presented.

PB80-804735 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Records Management. Volume 2. 1976-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Feb 80,
Mary E. Young. Feb 80, 174p
Supersedes NTIS/PS-79/0040, NTIS/PS-78/0058, and NTIS/PS-77/0076. See also Volume 1, 1964-1975, NTIS/PS-77/0075.

Reports on the management of manual or automatic records are cited. Records in the fields of medicine and hospitals, traffic engineering and control, social services, city and state governmental operations, information centers and libraries, and archives are included. (This updated bibliography contains 167 abstracts, 49 of which are new entries to the previous edition.)

PB80-805609 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Information Systems (Citations from the NTIS Data Base).
Rept. for Dec 70-Feb 80,
Elizabeth A. Harrison. Mar 80, 138p
Supersedes NTIS/PS-79/0121 and NTIS/PS-78/0029. Updates NTIS/PS-76/1048.

The topics covered relate to the mechanism for collecting, processing, analyzing, and transmitting the information required for organizing and operating health services and for research and training. Several subject areas included in the abstracts of research reports are health planning, health care administration, health education, health statistics, management information systems, and health care delivery. (This updated bibliography contains 131 abstracts, 16 of which are new entries to the previous edition.)

PB80-805617 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hospital Information Systems (Citations from the NTIS Data Base).
Rept. for Dec 68-Feb 80,
Elizabeth A. Harrison. Mar 80, 139p
Supersedes NTIS/PS-79/0122 and NTIS/PS-78/0030. Updates NTIS/PS-76/1048.

The selected abstracts of research reports cover development, implementation, and evaluation of hospital information systems. Some specific areas covered are medical records, effects on nursing, benefit cost analysis, blood banks, feasibility studies, and management information systems. (This updated bibliography contains 132 abstracts, 38 of which are new entries to the previous edition.)

PB80-805625 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Medical Information Systems (Citations from the NTIS Data Base).
Rept. for Feb 64-Feb 80,
Elizabeth A. Harrison. Mar 80, 213p
Supersedes NTIS/PS-79/0123, and NTIS/PS-78/0031. Updates NTIS/PS-76/1048.

Medical information systems are related to the prevention, diagnosis, and treatment of human diseases and injuries. Topics covered by the selected abstracts include emergency medical services, medical research, medical laboratories, medical records, radiology, patient monitoring systems and blood banks. Other subject areas included are: benefit cost analysis, evaluation, development, and implementation of medical information systems. (This updated bibliography contains 206 abstracts, 30 of which are new entries to the previous edition.)

PB80-927900 Standing Order
Central Intelligence Agency, Washington, DC.
All Communist Country Reports.
Irregular repts.
1980, Open series
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order. Single copies also available.

Subscription to this service automatically brings the full text of 'All Communist Country Reports', issued by the Central Intelligence Agency. The information reported is political, statistical, and economical in such areas as agriculture, metals, minerals, natural gas, oil, materials, political, economic and military structures of Communist countries. These same reports are also available with 'All Countries' reports issued by the CIA.

PB80-927901 PC **E09**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of Officials of the German Democratic Republic; a Reference Aid.
Jan 80, 264p CR-80-10125
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The directory is a functional reference guide to officials of the East German Government, the Socialist Unity Party (SED), and other prominent public organizations.

PB80-927902 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Key Soviet-Yugoslav Documents; a Reference Aid.
Feb 80, 36p PA-80-10032
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order.

The reference aid is a compilation of selected documents relevant to the relationship between the USSR and Yugoslavia. It also contains a brief description of the historical circumstances in which each of these documents was issued. It is intended as a tool for analysts who follow relations between these two states; it does not attempt to provide new insights into the Soviet-Yugoslav relationship nor to project the future of these relations.

PB80-928000 Standing Order
Central Intelligence Agency, Washington, DC.
All Non-Communist Country Reports.
Irregular repts.
1980, open series
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order. Single copies also available.

Subscription to this service automatically brings the full text of 'All Non-Communist Country Reports', issued by the Central Intelligence Agency. The information reported is political, statistical, and economical in such areas as agriculture, metals, minerals, natural gas, oil, materials, political, economic and military structures of Communist countries. These same reports are also available with 'All Countries' reports issued by the CIA.

PB80-928200 Standing Order
Central Intelligence Agency, Washington, DC.
China Reports.
Irregular repts.
1980, open series
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order. Single copies also available.

Subscription to this service automatically brings the full text, of all 'China Reports', issued by the Central Intelligence Agency. The information reported is political, statistical, and economical in such areas as agriculture, metals, minerals, natural gas, oil, materials, political, economic and military structures of Communist countries. These same reports are also available with 'All Communist Country' reports and also with 'All Countries' reports issued by the CIA.

5C. Economics

AD-A079 740/7 PC **A07**/MF **A01**
Public Research Inst Alexandria VA
The Economic Effects of Environmental Expenditures on the Construction Industry.
Research contribution,
James Jondrow, David Chase, Christopher Gamble, Louis Jacobson, and Robert Levy. Sep 79, 142p Rept no. CRC-339
Contract EPA-68-01-4353

Between 1978 and 1985, municipal governments and private industry will spend about $111 billion dollars on construction of new facilities to reduce air and water pollution as mandated by the EPA. This report presents estimates of how these projected expenditures will affect the total level of construction and how employment, wages, interest rates, and other variables will respond to the change in construction output. Effects on employment in selected sub-classes of the construction industry were also estimated. The response of the

construction industry to increased spending for pollution control was estimated by use of an econometric model of the industry. The model, developed for this study, was simulated to predict the effects of projected spending through 1985. The results suggest that construction output will rise by less than the EPA mandated expenditure. The difference is due, in part, to displacement of spending that local governments would otherwise have done and, in part, to absorption of the increase by rising wages and prices in construction. There is also some displacement of industrial expenditures for pollution abatement because of the increased cost of building a new plant. The results also suggest that employment in the construction industry is increased. Employment of young, black, inexperienced workers increases more than would be expected based on their representation in the construction labor force. (Author)

AD-A079 780/3 PC **A04**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Izhevskiy Petroleum Equipment Plant.
3 Apr 79, 67p Rept no. FTD-ID(RS)T-0338-79
Edited trans. of mono. Povysheniye Effektivnosti Proizvodstva Izhevskogo Zavoda Heftyanogo Mashinostroyeniya v Dva Raza Na Osnove Planomernogo Tekhnicheskogo Perevooruzheniya i Vnedreniya Nauchnoy Organizatsii Proizvodstva, Truda i Upravleniya v 1975, Moscow, 1971 p1-43, by Marilyn Olaechea.

No abstract available.

AD-A079 892/6 MF **A01**
American Univ Washington DC Foreign Area Studies
Syria: A Country Study.
Area handbook series,
Richard F. Nyrop. Oct 78, 272p DA-PAM-550-47
Supersedes report dated May 71, AD-735 004.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $9.00. Microfiche furnished to DTIC (and NTIS) users.

Contents: Historical Setting; The Society and Its Environment; The Economy; Government and Politics; and National Security.

AD-A079 928/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Semiconductor Producing Industry in the USSR,
Y. A. Fedorov. 18 Jun 79, 10p Rept no. FTD-ID(RS)T-0679-79
Edited trans. of Elektronika (Poland) n10 p381-382 1977, by Ilia Kimmelfeld.

No abstract available.

HRP-0028216/0 Not Available NTIS
Texas Univ. Health Science Center at Houston. School of Public Health.
Economic Returns to Employment-Based Alcoholism Programs -- A Methodology.
J. Michael Swint, Michael Decker, and David R. Lairson. 1978, 6p
Pub. in Jnl. of Studies on Alcohol v39 n9 p1633-1638 1978.

In order to estimate the economic returns from an alcoholism rehabilitation program, a model incorporates the costs to a firm if an alcoholic employee dies or leaves due to alcohol misuse. On the other hand, if the alcoholic employee does not leave the firm, the model incorporates the costs to the firm that rehabilitation would avoid. These include the costs of excessive absenteeism, lower productivity, and alcohol-related medical and disability costs that the firm must bear. Many firms provide some form of insurance coverage for inpatient and outpatient treatment of alcoholism. Those that are self-insured would receive the full benefit of reduced medical expenses, and for those that use third-party carriers, substantial reductions in medical care costs should be reflected in lower future insurance premiums. The costs of the rehabilitation program in any given year include direct program expenditures and the indirect cost of the work loss of patients attending therapy and treatment sessions. This method is retrospective in that it considers the total long-range economic impacts of past activity, e.g., the rehabilitation. If a firm desired a prospective analysis, it would be necessary to project the number of rehabilitations per year.

HRP-0030730/6 Not Available NTIS
Economics and Health Planning.
Kenneth Lee. 1979, 195p
Available from Croom Helm Ltd., 2-10 St. John's Rd., London SW11, England.

Medical care is not provided in an unconstrained environment, and clinical freedom as such is limited by a lack of knowledge, skills, and facilities. With more economists working in the health care field and with more educational programs to prepare economists who accept health care positions, their role in formulating health service policies is significant. In addition, true costs of delivering health care are an important realm of economists. Cost-benefit analysis of policy options is related to the assessment of health care costs. Other areas of interest to economists are: estimating the impact of certain economic variables on the utilization of medical services, estimating supply elasticities of different inputs to the medical care system, and examining the way in which planning and budgeting systems operate. Seven essays focus on values in health care, the planner's dilemma in assessing need versus demand, planning and hospital costs, the evaluation of health service developments, economics and planning for the care of elderly persons, problems in applying economics to health service planning, and the role of economists and economics in health service planning. References, illustrations, a bibliography, and an index are included.

PB80-131535 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of City and Regional Planning.
Documenting the 'Decline' of the North.
Final rept.,
Carol L. Jusenius, and Larry C. Ledebur. Jun 78, 21p EDA/ERD-80-006
Grant EDA-PF-572
Supersedes PB-274 555.

The study examines the hypothesis that the poor employment performance of the North (New England, Middle Atlantic and East North Central) is due to the migration of firms to the South. The study investigates recent changes in the composition of business enterprises and the migration of these firms to, from, and within the Northern region. The migration debate is resolved by making intraregional and interregional comparisons as to the source of firm and employment losses. Comparisons are made of firm birth, death, and migration rates by industry within and between regions. The study utilizes a file from Dun and Bradstreet containing data on nearly one million firms over a five-year period. This data base permitted 'the examination of firms by location, industry and employment size, not only at a point in time, but over time'. The study found that out-migration of employers is a relatively insignificant problem for the North. The primary source of firm and employment losses was the closure of firms, not their migration. However, the Middle Atlantic states have suffered from the migration of firms between states within the North.

PB80-132897 Not available NTIS
National Bureau of Standards, Washington, DC.
Calculating the Solar Dollar Gains: Ins and Outs of Life Cycle Costing.
Final rept.,
R. Ruegg. Jul 79, 4p
Sponsored in part by Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Pub. in Sol. Eng. Mag., p11-14, Jul 79.

This article provides an overview of life-cycle costing and describes briefly how the federal government is applying the technique to different kinds of investment decisions in its programs to conserve non-renewable energy and to demonstrate the use of solar energy in federal buildings.

PB80-134422 PC **A03**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Center.
Fresh Water Export by Oil Tankers.
Completion rept.,
Maurice Mow. Oct 79, 30p W80-02769, OWRT-A-043-ME(2)
Prepared in cooperation with California State Univ., Chico. Dept. of Civil Engineering.

An economic model was developed to study the potential for fresh water export to arid oil exporting nations by returning oil tankers. Currently Very Large Crude Carriers (VLCC) are ballasted with salt water for their return trip, however, most tanker ports in the U.S. are located in 'water excess' zones such as the Gulf Coast and North Atlantic states giving easy access to fresh water loading. Costs associated with water export are those for pipes, right-of-ways, intake towers, and water treatment facilities. The model estimates the capital expenditure necessary for a water export facility and the water rate (dollars/1000 gallons) required to liquidate that capital. The model has six components that are described in detail. Results of a North Atlantic deep water port example are given to illustrate the model with non-site-specific conditions being estimated.

PB80-134679 PC **A06**/MF **A01**
North Side Community Development Corp., Minneapolis, MN.
Near North Side: A Unique Opportunity for Business.
Final rept.
Oct 79, 110p EDA-80-010
Grant EDA-06-06-01530-40
Prepared in cooperation with Midwest Research Inst., Minnetonka, MN.

The report contains a market study of the development potential of Minneapolis' Near North Side. The purpose of the research is to create long-term job opportunities for residents of the Near North Side to alleviate unemployment, particularly among minorities. The workbook consists of five parts: (1) Introduction/Community Profile; (2) industrial market opportunities; (3) industrial land opportunity areas; (4) commercial development opportunities; and (5) community economic development strategy.

PB80-135361 PC **A07**/MF **A01**
Public Research Inst., Alexandria, VA.
The Economic Effects of Environmental Expenditures on the Construction Industry.
Final rept.,
James Jondrow, David Chase, Christopher Gamble, Louis Jacobson, and Robert Levy. Sep 79, 141p CRC-339, EPA/230/3-79/008
Contract EPA-68-01-4353

Between 1978 and 1985, municipal governments and private industry will spend about $111 billion dollars on construction of new facilities to reduce air and water pollution as mandated by the EPA. The report presents estimates of how these projected expenditures will affect the total level of construction and how employment, wages, interest rates, and other variables will respond to the change in construction output. Effects on employment in selected sub-classes of the construction industry were also estimated. The response of the construction industry to increased spending for pollution control was estimated by use of an econometric model of the industry. The model, developed for the study, was simulated to predict the effects of projected spending through 1985.

PB80-135452 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
The Air Services Industry and Economic Development in New York City, A Strategy for the 1980s.
Dec 79, 134p EDA-80-003
Grant EDA-01-6-01811

The report recommends strategies to the agencies concerned with economic development policy in New York City for maximizing the opportunity represented by the air services industry to contribute to the City's economy in the 1980s. The air services industry contributed to the City's economy in three important ways. First, through employment; second, through the support of a wide variety of supplementary jobs in related activities; and third, through the provision of travel services. Recommended strategies are of two types. The first is an overall strategy. The second type of strategy concerns methods for dealing with the problems of the areas surrounding J.F. Kennedy International Airport. These are problems that have been caused by the rapid growth of airport related activities, mainly the air cargo industry, in the vicinity of the airport.

PB80-136948 PC A02/MF A01
National League of Cities, Washington, DC.
Making Sense Out of Dollars: Economic Analysis for Local Government. A Summary for Local Officials.
Executive summary,
Todd W. Areson, and Susan S. Glickstein. Jul 79, 18p HUD-0000897

This executive summary of a volume designed for local government staff responsible for carrying out economic analysis techniques provides information on supervising such techniques, interpreting the data, and making plans for the future based on the results. Mayors, county executives, council members, managers, or other policy officials may use it in conjunction with the comprehensive handbook, the parent volume. Nine different kinds of economic analyses are reviewed: (1) economic base analysis, (2) employment shifts and shares, (3) local labor market analysis, (4) revenue projections, (5) cost - benefit analysis, (6) cost - effectiveness analysis, (7) pricing for local government, (8) cost - revenue analysis, and (9) tax incidence study. Four sections break each analysis technique down into a description of the analytic process involved, explaining what kinds of data the results are based on; the kinds of questions that lie behind the analysis technique; what situations fit which analysis, and how far the results can be trusted; and sample problems and solutions. This last section includes references to the companion handbook for detailed information on specific problems. Finally, a glossary of terms used in both the handbook and the summary is appended. (Author abstract modified).

PB80-137037 MF A01
National Training and Information Center, Chicago, IL.
Guidebook: Home Mortgage Disclosure Act and Reinvestment Strategies.
Jan 79, 94p HUD-0000908, HUD/PDR-452
Contract HUD-H-2666
Paper copy available from the Sup. of Docs., Stock number 023-000-00554-9.

To combat housing discrimination, this guidebook explains how to collect data resulting from the enactment of the Home Mortgage Disclosure Act (HMDA). The HMDA requires federally supervised lending institutions to annually publicize the precise number of mortgage loans they have made, the amount of each of the loans, and the location of the properties receiving the loans. From these facts, community groups and local governments can determine whether or not mortgage credit has been withheld from certain neighborhoods and can analyze local housing markets. The guidebook will be helpful in negotiating new programs with lenders, challenging lender applications for regulatory approval, and monitoring the progress of reinvestment programs. In addition to HMDA, a number of State and local statutes require the reporting of lender activity. Information from these combined sources is termed 'disclosure data.' Key provisions of HMDA and application of HMDA data are explained, and five examples of applications are included with one or more case studies as illustrations. The disclosure data application examples cover analyzing local housing markets (case studies in eight cities, disinvestment in northwest Philadelphia, and the Baltimore mortgage market study), negotiating with lenders (Northwest Bronx Community and Clergy Coalition), challenging lender applications for regulatory approval (the Evanston Housing Coalition (Illinois), and Missouri's association of community organizations for reform), creating reinvestment programs (South Shore, Chicago, Ill., and the District of Columbia Neighborhood Reinvestment Commission), and monitoring reinvestment programs (Baltimore Citizen's Planning and Housing Association, Institute of the Study of Civic Values, and Citizens for Community Improvement). Appendices contain HMDA disclosure data forms and regulations, a list of Federal regulatory HMDA enforcement agencies, and related information. Charts and tabular data are included.

PB80-137045 PC A04/MF A01
RAND Corp., Santa Monica, CA.
Income Elasticity of Housing Demand. Housing Assistance Supply Experiment.
John Mulford. Jul 79, 51p HUD-0000915
Contract HUD-H-1789

The longrun income elasticity of housing expenditures for owners and renters is estimated using cross - sectional data from the two HUD Housing Assistance Supply Experiment (HASE) sites -- Brown County, Wis., and St. Joseph County, Ind. Because intersite differences are not statistically significant, results are averaged across sites. As differences by tenure are significant, both the owner estimate and the renter estimate are reported; however, an assessment of possible biases in each suggests that the tenure difference is probably slightly overstated. Income elasticities estimated with permanent income for households that remained in their housing units for three surveys are computed as are income elasticities estimated with varying incomes (linear, spline, and log - exponential models are used). The evidence is consistent with either constant or slightly increasing elasticity with income. Since an interest in low - income households implies an interest in those headed by elderly persons or single parents, and those composed of young couples with young children, results refer to these household types. Although sizes are insufficient for conclusive inferences, some samples indicate that elderly and single - parent households spend more on housing than others but increase their expenditures at a lower rate as incomes rise. Most importantly, the study found that income elasticity of housing expenditures in the HASE sites is very low, both absolutely and relative to conventional wisdom and recently published estimates. If these findings are valid, then pure income transfers would not greatly affect the recipients' housing expenditures. Tabular data, variable means and standard deviations used in computations, the log and spline model results, and references are provided. (Author abstract modified).

PB80-137409 PC A05/MF A01
Abeles, Schwartz, Haeckel and Silverblatt, New York.
Feasibility of a Mobile Home Park on the Standing Rock Reservation, Fort Yates, North Dakota.
Nov 79, 83p EDA-80-014
Grant EDA-05-06-01682

The report seeks to determine the economic feasibility of developing a mobile home park in the vicinity of Fort Yates, North Dakota. Fort Yates is an administrative center for the Standing Rock Sioux Reservation. The purpose of the mobile home park is to serve employees of the Sioux Tribe who require housing close to their place of employment.

PB80-137441 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Assessment of Employment and Unemployment Statistics for Nonmetropolitan Areas.
Rural development research rept.,
Sigurd R. Nilsen. Dec 79, 28p RDRR-18

Low levels of data reliability, inadequate economic concepts, and metro-nonmetro differences in economic structure result in labor force statistics that frequently portray conditions in nonmetro areas to be better than they actually are. Unemployment statistics are used to allocate billions of Federal dollars to State and local governments for economic development, manpower, and other programs, so inaccurate statistics can result in an underallocation of funds to nonmetro areas. The report examines some of the factors that contribute to this problem, focusing specifically on those affecting labor force statistics.

PB80-137839 PC A07/MF A01
National Bureau of Economic Research, Inc., New York.
A Report on the Determinants of Research and Development Expenditures and Their Effects on Labor Productivity of the Firm,
M. Ishag Nadiri. 1977, 148p
Grants NSF-PRA74-19307, NSF-DA-43877
Prepared in cooperation with New York Univ., NY. Dept. of Economics.

The report examines the relationships between R&D activities and productivity at the level of the individual firm. A dynamic model of the determinants of investment, employment, and R&D is used. The main findings are: (1) The firm's employment, capital accumulation, and R&D decisions are closely intertwined, and a dynamic interaction process seems to underlie these decisions. (2) The R&D activities of the firm, like its demand for labor and capital, are influenced significantly by both output and relative input prices and by degree of capacity utilization. (3) Both labor productivity and investment demand of the firms are affected significantly by their R&D expenditures, and labor productivity is significantly affected by capital accumulation. (4) The model is a good predictor of investment, employment, and R&D investment of individual firms.

PB80-137896 PC A10/MF A01
National Rural Center, Washington, DC.
Rural Jobs from Rural Public Works, A Report of Research Findings. Rural Employment Outreach Project.
Final rept. 1 Feb 78-31 Jan 80,
Curtis D. Toews, Carmen Avila, Kathryn Baker, Walter Davis, and Margaret Lovelace. 31 Jan 80, 212p DLMA-21-11-76-06-4-1
Contract DL-21-11-76-06

The report describes the research inferences of a four-year experimental and demonstration project designed to increase the number of local, minority and/or economically disadvantaged persons employed on federally-financed construction projects in rural areas. Activities centered on six rural construction projects: the Tennessee-Tombigbee Waterway Project in Alabama and Mississippi, and Red River Waterway Project in Louisiana, the Ouachita-Black Waterway Project in Arkansas and Louisiana, the Richard B. Russell Dam Project in Georgia and South Carolina, and the Choke Canyon Dam in Texas. The report examines the effectiveness of rural afirmative action policies and recruitmet and training programs for the employment of minority, female, and/or economically disadvantaged persons living near the six rural construction projects.

PB80-137920 PC A07/MF A01
Wilson (J. W.) and Associates, Inc., Washington, DC.
Automatic and Discretionary Adjustment Procedures for Electric Utility Rates, Volume I.
Final rept.,
Ralph E. Miller, and J. W. Wilson. Nov 79, 129p NBS-GCR-ETIP-79-77
Contract NBS-5-35894

The report explores the policy considerations relating to the use of interim adjustment procedures, both automatic and discretionary. The primary emphasis concerns fuel adjustment procedures which are the most common interim adjustments used for electric utilities. Section A explains how an interim adjustment procedure works. Section B is a brief but comprehensive statement of the advantages and disadvantages of interim adjustment procedures. Sections C through F relate specifically to fuel adjustment procedures. The components of fuel and purchased power costs are identified in Section C, and the three principal approaches to fuel adjustments are presented there. The advantages and disadvantages of these three approaches are discussed in Section D, and some problems in implementing fuel adjustments are identified. Section E is a discussion of the problem of preserving incentives when fuel adjustment procedures are utilized. Section F is a discussion of special considerations that are applicable to some electric utilities. Section G is a discussion of interim adjustment procedures for cost elements other than fuel. It focuses on labor costs, taxes, and the composite of all operating costs other than fuel and purchased power.

PB80-138126 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Marketing and Purchasing Div.
Producers Export Company: The Beginnings of Cooperative Grain Exporting.
Farmer cooperative research rept.,
Bruce Reynolds. Jan 80, 27p FCRR-15

Formation of the Producers Export Company (PEC) in 1958 was a first attempt by grain cooperatives to develop an export merchandising program. PEC's nationwide membership had different

export needs and financial resources which imposed constraints on PEC's strategy and operations. A lack of consensus by the directors prevented them from effectively adapting and changing PEC's methods of operation. The historical report explores the development of PEC and analyzes reasons for its termination in 1969.

PB80-138233 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Transportation Fuel Requirements in the Food and Fiber System.
Agricultural economic rept.,
John A. Barton. Jan 80, 48p AER-444

It took an estimated 2,892 million gallons of diesel fuel and 411 million gallons of gasoline to transport farm inputs, commodities, and manufactured food products in 1977. Truck shipments made up 41 percent of total ton-miles in the food and fiber system and required 2,529 million gallons of petroleum fuels, or 77 percent of the total. Rail movements required 665 million gallons of fuel, or 20 percent. Barge shipments accounted for most of the remainder. Demands for transportation fuel in the food and fiber system are likely to continue to increase in the foreseeable future.

PB80-138431 PC **A03**/MF **A01**
Minnesota Dept. of Economic Development, St. Paul.
A Marketing Study: Silver Bay, Minnesota.
Jun 79, 30p EDA-80-012
Contract EDA-06-06-01536-40
Prepared by Beck and Associates, Duluth, MN.

The marketing study of Silver Bay examines the business potentials for the city. This information includes the following: (1) A field survey of dwelling units and of business establishments throughout the trade area which categorized the businesses by type and floor area; (2) A questionnaire survey of retail-service establishments to determine their operating characteristics and the attitudes and opinions of their operators towards the community, business climate, etc; and (3) A household telephone survey which contacted 321 households, representing 16 percent of the trade area population, to identify current demographic characteristics, the existing shopping patterns and the attitudes and opinions of trade area residents about Silver Bay stores and the community generally.

PB80-138738 PC **A06**/MF **A01**
Mississippi Research and Development Center, Jackson. Business and Industry Development Div.
A Program of Technical Assistance to Mississippi Business and Industry, 1978-1979.
Final rept.,
Carol Ann Lloyd. Feb 80, 125p EDA-80-017
Grant EDA-04-06-01577-1

The Research and Development Center in Jackson, Mississippi is a fundamental element in the research-planning-action sequence necessary for accelerating economic growth in Mississippi. The organizational and administrative structure for this project has been designed to achieve maximum impact in providing technical assistance to business and industry in the grant counties and to ensure effective management controls on individual project assignments and budget administration. The report covers work performed during the period October 1, 1978 through September 30, 1979.

PB80-139009 PC **A04**/MF **A01**
Stanford Univ., CA. Center for Research in Economic Growth.
Model of Regulated Oligopoly with Product Quality Variation: The Case of Passenger Airlines,
John Panzar. Nov 73, 61p M-157, NSF-RA-S-73-068
Grant NSF-GI-39613

The domestic passenger airline industry presents a thorny regulatory problem because of the interactions between an oligopolistic market structure and widespread nonprice competition. The paper develops a general model of nonprice or quality variation under price regulation for both monopoly and oligopoly market structures. The general model is simplified by use of assumptions applicable to scheduling frequency competition in a stylized airline market. A Cournot-Nash model of oligopolistic equilibrium is used to: (1) develop a theory of market behavior; (2) compare monopoly and oligopoly market structures; and (3) consider the effects of the entry of additional competitors into a market. The implications of the model for certain CAB regulatory policies is then examined. Finally, a preliminary attempt is made to model the effects of CAB decisions on fares and entry. Throughout the analysis, the emphasis is on developing hypotheses subject to empirical test.

PB80-139553 PC **A10**/MF **A01**
California Univ., Los Angeles. Water Resources Center.
A Probabilistic Optimization Model for Water Resources Capacity Expansion with Price-Sensitive Seasonal Demand.
Doctoral thesis,
Bill Nieh. 1979, 202p W80-02606, OWRT-A-062-CAL(3)

The study presents the development and application of a mathematical programming model for planning regional water resources capacity expansion when seasonal demands are price dependent and inflows are stochastic. This multi-planning period model simultaneously considers the investment and allocation (pricing) decisions associated with the present and future water resources development. The procedure consists of selecting the sizing, sequencing and timing of investment in surface reservoirs, water conveyance facilities, seawater desalting plants that maximizes the present worth of the total expected benefits (consumer's willingness-to-pay) less investment costs, operating costs and future debts. Groundwater storage is considered an integral part of this selection. Instream quantity requirements for quality control and a revenue constraint that requires the total discounted revenues must cover the total discounted costs are explicitly considered in this optimization model. Long-run seasonal price-sensitive bulk water demand is a key variable in this investment planning model. It serves both as an indicator of water value and as a feedback signal to consumers, reflecting the cost of investments required to satisfy particular demand. The mathematical programming model that if formulated is large scale and has both binary and linear constraints. A mixed integer linear programming code based on a branch-and-bound algorithm is used to obtain solutions to the model.

PB80-140353 PC **A03**/MF **A01**
Stephens Associates, Raleigh, NC.
Fiscal Impact of Historic and Commercial District Revitalization: A Case Study in Santa Cruz, California.
Final rept.
Dec 78, 45p EDA-ERD-80-009
Grant EDA-PF-655

The report concerns the analysis of the fiscal impacts of the investments made by the City of Santa Cruz, California, in its Central Business District. In conjunction with the public expenditures, and stimulated by them, private enterprise has revitalized the area and preserved a large number of buildings. Several have been adapted to new commercial uses. The analysis showed that Santa Cruz realizes a substantial net income from its investments and operating expenditures in its Central Business District.

PB80-141724 PC **A05**/MF **A01**
International Customs Tariffs Bureau, Brussels (Belgium).
India: International Customs Journal. Number 4, 21st Edition, Year 1979-1980.
Nov 79, 100p
See also 20th edition, PB-169 256.

The reports present authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of customs duties and exemptions applicable to goods imported into or exported from the country.

PB80-143951 PC **A02**/MF **A01**
Bureau of Mines, Washington, DC.
Gypsum,
Jean W. Pressler. Nov 79, 16p
Report on Mineral Commodity Profiles.

Gypsum is the most common of the naturally occurring sulfate minerals. It is found in very extensive, bedded sedimentary deposits all over the world and associated with limestones, shales and sandstones, marls, and clays. Crude commercial gypsum is generally high-grade material, the major portion of which can be utilized with no beneficiation. The report presents comprehensive data on gypsum including industry structure, uses, reserves-resources, technology, supply-demand relationships, economic factors and problems, and outlook to 2000.

PB80-144025 PC **A02**/MF **A01**
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Search for Appropriate Technology for the United Kingdom Paper and Board Industry.
Background paper,
D. Attwood. 18 Oct 78, 17p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products. Sponsored in part by Agency for International Development, Washington, DC.

Paper and board are internationally traded products, and most national industries have similar characteristics and problems. In recent years world market conditions have been unfavorable, and the UK paper and board industry has faced severe problems. This paper describes the structure of the current UK paper and board industry and sets this in the context of the common market (EEC) and world scene. The problems in finding indigenous raw materials are described and the role wastepaper plays as a raw material is discussed. The problems caused by the size new pulp mills have to be, to be viable, is examined, especially in the context of building new straw pulping plants which could integrate with existing paper and board mills.

PB80-144041 PC **A03**/MF **A01**
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Provision of Drugs by Appropriate Technology.
Background paper,
Paul Dunnill. 3 Oct 78, 36p
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals. Sponsored in part by Agency for International Development, Washington, DC. Prepared in cooperation with Intermediate Technology Development Group, London (England).

The first part of the report outlines the technical considerations which lead the Intermediate Technology Development Organization (ITDG) to develop its current policy. These include: The problem of supply; production of basic chemicals; drugs from microbial sources; drug compounding; the pharmaceutical auxiliary; and other technologies needed for drug production. The objectives of a current project are then described. A brief analysis is given of the ways in which government policies influence the provision of drugs particularly to poor rural communities. An appendix lists technology appropriate to different types of countries. A bibliography is included.

PB80-144066 PC **A04**/MF **A01**
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Small-Scale Rural Industries: Light Engineering Workshops.
Background paper,
V. Austin. 3 Oct 78, 56p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops. Sponsored in part by Agency for International Development, Washington, DC. Prepared in cooperation with Intermediate Technology Development Group, London (England).

Small scale rural industries can make a major contribution to assist the poor and especially the landless, in the rural areas of developing countries. At present, the amount of assistance given by national and international programs is relatively negligible, and from the author's experience, virtually all rural industrial activities at the field level in developing countries are without adequate direct government assistance. If a modest start is to be made to help provide some additional employment and incomes for the poor of rural areas through non-farm activities, a massive training program must be started now, and supported by adequate services, at both the national and international levels.

PB80-144082 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Measurement of U.S. Agricultural Productivity: A Review of Current Statistics and Proposals for Change.
Feb 80, 57p TB-1614

The report reviews the concept and measurement of agricultural productivity with special references to USDA multifactor productivity statistics. An American Agricultural Economics Association task force has examined the sources and procedures used in constructing the existing statistics and recommends that USDA: (1) place greater emphasis on improving methodology; (2) move further toward a complete factor productivity measure; (3) replace the requirements approach by direct sampling in constructing the labor input; (4) use the product approach in defining the agricultural sector; (5) improve accounting for quality change in inputs; and (6) adopt a series of specific improvements for constructing specific inputs and aggregating procedures.

PB80-145053 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Bibliography of Economic Regulation of Agricultural and Nonagricultural Industries, 1960-79.
Bibliographies and literature of agriculture,
Winston W. Grant, and Dale C. Dahl. Feb 80, 55p B/LA-6

The bibliography serves as an aid to those interested in researching the theory, economic effects, and other implications of regulation of agriculture and the food system. Additional references discuss the regulation of industries other than agriculture so that the methods and theories of nonagricultural regulation can be compared with the regulation of agriculture and food industries.

PB80-148711 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Analysis of Pure Maple Syrup Consumers.
Forest Service research paper,
Paul E. Sendak. 1974, 15p FSRP-NE-295, NEFES/80-45

Users of pure maple syrup who live in the syrup-producing area differ from consumers in other parts of the United States in their pattern of syrup use and purchase. This survey analyzes differences in user attitudes and habits and in the packaging and distribution of syrup.

PB80-928001 PC **E05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Non-OPEC LDCs: External Debt Positions.
Research paper.
Jan 80, 120p ER-80-10030
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual document; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The oil-related surge in the combined non-OPEC LDC current account deficit from $9 billion in 1973 to $34 billion in 1975 is being replicated on a somewhat smaller scale in 1979-80. The group's deficit is expected to exceed $50 billion in 1980, and total medium- and long-term debt probably amounted to more than $250 billion in 1979. An important structural change in LDC debt has been the major shift to increased borrowings from private sources.

PB80-928202 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
China: International Trade Quarterly Review, Second Quarter, 1979.
Research paper.
Jan 80, 37p ER/CIT-80-001
Errata sheet inserted.Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

This is the second in a series of quarterly reports on China's foreign trade that replace the annual publication, China: International Trade. In addition to the text and tables highlighting trends in trade through the first half of 1979, this issue contains special sections providing commodity and balance-of-payments data for 1978. Separate tables include miscellaneous trade information such as Hong Kong reexports of Chinese goods by destination and commodity composition and a tabulation listing credits recently made available to China. The data-with the exception of an aggregate estimate of the cost, insurance, and freight (c.i.f.) value of imports in table 15-are presented on a merchandise trade basis, with both exports and imports valued free on board (f.o.b.) at port of origin.

5D. History, Law, and Political Science

AD-A079 602/9 PC **A07**/MF **A01**
Stanford Research Inst Menlo Park CA Strategic Studies Center
Great Power Interests and Conflicting Objectives in the Mediterranean-Middle East-Persian Gulf Region. Part I. Background Studies.
Technical note,
R. M. Burrell, Curt W. Gasteyger, Alvin J. Cottrell, Bernard Lewis, and S. W. B. Menaul. Dec 74, 143p Rept no. SSC-TN-3115-5
Contract DAAG39-74-C-0082
See also Part 2, AD-C018 489, and AD-A002 584.

This volume contains a collection of background papers prepared by recognized experts on subjects pertinent to the Middle East situation; these papers were used, among many other sources, for appropriate inputs of information and analytical interpretation into the main study, AD-A002 584. Topics include: Foreign Policies of Egypt, Syria and Saudi Arabia; Analysis of the Issues Affecting South Asian Regional and International Security and Stability; Western Europe, the Middle East, and Transatlantic Relations; AND THE Arab-Israeli Conflict and the Military Balance in Arabia and Central Asia.

AD-A079 603/7 PC **A11**/MF **A01**
Stanford Research Inst Menlo Park CA Strategic Studies Center
Soviet Opportunities in the Third World. Background Studies: Supplement.
Final rept.,
Leon Goure, Milorad Popov, William E. Ratliff, G. Edward Clark, and Edward J. Williams. Apr 76, 247p Rept no. SSC-TN-3115-13
Contract DAAG39-74-C-0082
Supplement to Rept. no. SSC-TN-3115-14, AD-A025 303.

This volume contains five background papers on the general subject of opportunities for extension of Soviet influence in the Third World. These papers were used, along with other souces, in the preparation of the summary report, AD-A025 303. Topics include: Latin America; The Soviet Union and Latin American Leftwing Military Regimes; Communist Parties, Indigenous Insurgent Groups and International Labor Groups in Sub-Saharan Africa; and Nigeria.

AD-A079 604/5 PC **A08**/MF **A01**
SRI International Arlington VA Strategic Studies Center
U.S. Strategy in the Event of a Failure of Detente.
Final rept.,
William M. Carpenter, Stephen P. Gibert, William F. Lackman, James E. Dornan, Jr., and Walter Hahn. May 75, 159p Rept no. SSC-TN-3115-8
Contract DAAG39-74-C-0082
See also AD-A079 605.

This study identifies and assesses the alternative integrated U.S. strategies for a future situation in which: (1) detente collapses; (2) the Cold War resumes; and (3) the avoidance of conflict between the superpowers continues to be a mutually shared objective. The differing perceptions and objectives of detente from the U.S. and Soviet perspectives, and the factors which could cause detente to fail are analyzed as a framework for examination of the U.S. options and their military implications.

AD-A079 605/2 PC **A02**/MF **A01**
SRI International Arlington VA Strategic Studies Center
U.S. Strategy in the Event of a Failure of Detente. Executive Summary.
Technical note,
William M. Carpenter, Stephen P. Gibert, William F. Lackman, James E. Dornan, Jr., and Walter Hahn. May 75, 21p Rept no. SSC-TN-3115-9
Contract DAAG39-74-C-0082
See also AD-A079 604.

This volume summarizes a study which identifies and assesses the alternative integrated U.S. strategies for a future situation in which: (1) detente collapses; (2) the Cold War resumes; and (3) the avoidance of conflict between the superpowers continues to be a mutually shared objective. The differing perceptions and objectives of detente from the U.S. and Soviet perspectives, and the factors which could cause detente to fail are analyzed as a framework for examination of the U.S. options and their military implications.

AD-A079 751/4 PC **A04**/MF **A01**
Rand Corp Santa Monica CA
Outlasting SALT II and Preparing for SALT III.
Interim rept.,
William E. Hoehn, Jr. Nov 79, 63p Rept no. RAND/R-2528-AF
Contract F49620-77-C-0023

This report attempts to answer three questions regarding the strategic arms limitation talks: First, given that SALT II in and of itself does not resolve our major strategic problems, does it provide a framework within which planned U.S. unilateral actions would resolve those problems. If not, what kinds of additional limitations should the next round of negotiations--SALT III--aim for. And, finally, what set of plans and what strategy offer some promise of leading to an effective SALT III outcome. Some prospect is offered in at least one construct of SALT III, through lower ceilings and more explicit limitations on missiles, of permitting U.S. unilateral actions to redress the strategic balance. The suggested approach is to pursue and option-generating R&D strategy consistent with the provisions of SALT II. The issue is whether the U.S. political system can do a better job by competing while cooperating with the Soviet Union, rather than by merely switching intermittently from one course to the other.

AD-A079 972/6 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Hero Border Guards.
16 Aug 79, 7p Rept no. FTD-ID(RS)T-1093-79
Edited trans. of Sovetskiy Voin (USSR) n6 p6 1969, by Randy Dorsey.

No abstract available.

AD-A079 973/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Our Borders are Sacred,
A. Aleksandrov. 16 Aug 79, 10p Rept no. FTD-ID(RS)T-1094-79
Edited trans. of Voyennyye Znaniya (USSR) n5 p2-3 1969, by Randy Dorsey.

No abstract available.

AD-B025 003/5 PC **A09**/MF **A01**
Institute for Foreign Policy Analysis Inc Cambridge Ma

U.S. Maritime Interests in the South Atlantic. Volume I.
Final rept.,
Robert L. Pfaltzgraff, Jr., and Geoffrey Kemp. 1 Oct 77, 181p
Contract N00014-76-C-1160
See also volume 2, AD-B025 004L. DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The study is presented in two parts with two sets of appendices. Volume I, the focus of the study, concentrates on the potential sources of conflict in the South Atlantic region, the role of naval forces in the area, and the implications of present trends in the South Atlantic for U.S. policy. Volume II is a more detailed analysis of the South Atlantic's present and projected political and economic environment. It has been prepared as supportive companion to Volume I, providing background for and elaboration of the issues raised in the initial volume. Appendix I is a collection of papers prepared for the seven seminar sessions organized as part of the project. Appendix II is a collection of summaries of the discussions during those seminars.

AD-B025 004/3 PC **A07**/MF **A01**
Institute for Foreign Policy Analysis Inc Cambridge Ma
U.S. Maritime Interests in the South Atlantic. Volume II.
Final rept.,
Robert L. Pfaltzgraff, Jr., and Geoffrey Kemp. 1 Oct 77, 127p
Contract N00014-76-C-1160
See also volume 1, AD-B025 003L. See also appendix 1, AD-B025 005L. DDC Form 55 not necessary for document request.
Distribution limitation now removed.

See AD-B025 003L for abstract.

AD-B025 005/0 PC **A10**/MF **A01**
Institute for Foreign Policy Analysis Inc Cambridge Ma
U.S. Maritime Interests in the South Atlantic. Appendix I.
Final rept.,
Robert L. Pfaltzgraff, Jr., and Geoffrey Kemp. 1 Oct 77, 222p
Contract N00014-76-C-1160
See also Appendix 2, AD-B025 006L.
Distribution limitation now removed.

See AD-B025 003L for abstract.

AD-B025 006/8 PC **A05**/MF **A01**
Institute for Foreign Policy Analysis Inc Cambridge Ma
U. S. Maritime Interests in the South Atlantic. Appendix II.
Final rept.,
Robert L. Pfaltzgraff, Jr., and Geoffrey Kemp. 1 Oct 77, 94p
Contract N00014-76-C-1160
See also Volume 1, AD-B025 003L.
Distribution limitation now removed.

See AD-B025 003L for abstract.

AD-B026 015/8 PC **A09**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
The Problem of Soviet Vulnerabilities.
Special rept.,
Richard P. Clayberg. 30 Dec 77, 187p
Distribution limitation now removed.

This study is apparently the first-known attempt to examine the vulnerabilities of the Soviet Union on an across-the-board basis. Commencing with an examination of the nature of vulnerability itself, it then takes a specific look in succession at Soviet ideology, domestic and foreign affairs, geography, the military, and the economy. In each of these chapters there is a brief discussion of those more salient characteristics which give rise to areas seen as subject to outside exploitation; a substantial description, explanation, and evaluation of the more important vulnerabilities; and--where feasible--construction of patterns of vulnerability, i.e., where separate, exploitable weaknesses can be seen to combine into related, even synergistic, groups. The study concludes with a number of specific, practical suggestions as to what US policy makers might do to make best use of the Soviet vulnerabilities described. Because of the sheer enormity of the overall task of searching out, identifying, and preparing to exploit the vulnerabilities of the Soviet system, this study makes no pretense of being definitive. Instead it is aimed at sensitizing those who should be concerned as to what can and should be done about the matter. (Author)

PB80-129612 PC **A04**/MF **A01**
Duke Univ., Durham, NC. School of Law.
Significant Nonobvious Effects of the Abolition of the General Diversity Jurisdiction.
Final rept.,
Thomas D. Rowe, Jr. Aug 78, 70p FJRP-78/002
Contract J-XH7-05633-T

The study attempts to identify and evaluate the effects, beyond those already widely noted, of abolishing the general diversity jurisdiction of the United States District Courts. Previous discussion has focused on such matters as how much there remains of state court bias against out-of-staters to justify diversity jurisdiction; how much reduction in federal court caseloads would follow from abolition; and how desirable it would be to transfer the state law determinations involved in diversity cases to the state courts.

PB80-138902 PC **A07**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Coordinating U. S. Development Assistance: Problems Facing the International Development Cooperation Agency.
Report to the Congress.
1 Feb 80, 150p ID-80-13

The report is concerned with the coordination of U.S. policies and programs relating to U.S. bilateral development assistance programs, U.S. food aid, U.S. participation in the multilateral development banks, the development activities of international organizations, and nonaid resource transfers. It attempts to (1) define the coordination problem, (2) assess the effectiveness of the Development Coordination Committee, and (3) appraise the prospects of the new International Development Cooperation Agency.

PB80-139967 PC **A06**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Revision of Class Damage Procedures: Empirical Studies.
Final rept.
Nov 79, 115p FJRP-79/009
Contracts J-42661, J-XH7-04103-T
Sponsored in part by Contracts JADAG-79-M-1949, JAOIA-79-M-3093, and JAOIA-79-M-6268.

The volume is a compilation of four reports prepared over a two-year period in support of a Justice Department proposal for comprehensive revision of the federal procedure governing the class damage action. The studies provide better estimates of the impact and costs of the suggested revision in federal procedure. The first study, which encompasses two reports, examines the fiscal impact on the government of the proposed legislation. The second study examines the participation of small business over the last decade in antitrust class damage actions, to estimate the impact of the reform on small business. The final study estimates the amount of unclaimed recoveries that 'escheat' to the government after mass, small claim actions, and the extent to which these funds are used for subsequent enforcement.

PB80-146202 PC **A03**/MF **A01**
Fish and Wildlife Service, Fort Collins, CO. Cooperative Instream Flow Service Group.
Elements in Negotiating Stream Flows Associated with Federal Projects.
Instream flow information paper,
P. S. Wassenberg, Stewart Olive, Janet L. DeMott, and Clair B. Stalnaker. Aug 79, 49p
FWA/OBS-79/03, IFIP-9
Library of Congress catalog card no. 79-600204.

This report incorporates ideas for use in negotiations intended to solve water resource planning problems and makes that information available to encourage discussion and exploration of the issues presented.

5F. Humanities

PB80-127905 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Uncertainties Over Federal Requirements for Archeological Preservation at New Melones Dam in California.
21 Dec 79, 61p CED-80-29

The report on programs to preserve archeological and historical resources at the New Melones Dam project in California exemplifies problems facing Federal agencies responsible for implementing archeological salvage laws. Specific criteria have not been established to provide guidance on the amount of work that must be done to adequately comply with archeological salvage laws. This has contributed to conflicting stories about actions taken to protect these resources. GAO is making no recommendations until it completes a more in-depth review.

PB80-140023 PC **A18**/MF **A01**
Sonoma State Univ., Rohnert Park, CA. Cultural Resources Facility.
A Cultural Resources Survey of the Round Valley Indian Reservation, Mendocino and Trinity Counties, California.
Final rept.,
Suzanne B. Stewart, and David A. Fredrickson. Nov 79, 411p NPS/WAC-79/17
Contract NPS-CX-8100-7-0005

A complete cultural resources survey was conducted of all 17,778 acres of tribal lands on the Round Valley Indian Reservation. In addition extensive archeological and ethnographic research was done of the Covelo Indian Community. Three hundred sixty-eight cultural resources were recorded and a Round Valley Archeological District was proposed. The distribution of recorded sites was analyzed in relation to selected environmental variables. The results of the analysis suggest many new avenues for research and answer some basic questions regarding settlement pattern. Four hundred seventy-five artifacts were collected and are described in the report.

PB80-142631 PC **A22**/MF **A01**
Nevada State Museum, Carson City. Dept. of Anthropology.
Excavations at Marble Bluff Dam and Pyramid Lake Fishway, Nevada. Parts I, II, III, IV, V, and VI.
Final rept.,
Donald R. Tuohy, and David T. Clark. Jul 78, 521p 13C
Contract HCRS-C2520
Prepared in cooperation with Pittsburgh Univ., PA. Dept. of Anthropology.

Three Great Basin Archaic open sites (26Wa1014l, 26Wa1016, and 26Wa1020) located near the Truckee River Delta in the Pyramid Lake Basin were excavated to explore structural remains, burial patterns, and ecological adaptations and to place them culturally and chronologically in western Nevada prehistory. The single component site, 26Wa1014l, yielded a protohistoric Northern Paiute house floor with a central fire hearth and a nearby tightly flexed, primary inhumation, a child of undetermined sex under an oval shaped flat slab metate. The fire hearth contained Carbon 14, dated and corrected to A.D. 1460 to A.D. 1650. The two multicomponent sites, (26Wa1016 and 26Wa1020), yielded a total of 11 fire pits, 9 pit structures, and 4 human interments dating from Medithermal Period occupations, or from Early Pyramid phase times to the Reservation phase, or from 2000 B.C. to A.D. 1900.

5H. Man-Machine Relations

N80-16737/2 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Human Performance Center and Aviation Psychology Lab.
Multi-Modal Information Processing for Visual Workload Relief.
M. W. Burke, R. D. Gilson, and R. J. Jagacinski. 1980, 28p NASA-CR-162720
Grant NSG-2179

The simultaneous performance of two single-dimensional compensatory tracking tasks, one with

the left hand and one with the right hand, is discussed. The tracking performed with the left hand was considered the primary task and was performed with a visual display or a quickened kinesthetic-tactual (KT) display. The right-handed tracking was considered the secondary task and was carried out only with a visual display. Although the two primary task displays had afforded equivalent performance in a critical tracking task performed alone, in the dual-task situation the quickened KT primary display resulted in superior secondary visual task performance. Comparisons of various combinations of primary and secondary visual displays in integrated or separated formats indicate that the superiority of the quickened KT display is not simply due to the elimination of visual scanning. Additional testing indicated that quickening per se also is not the immediate cause of the observed KT superiority.

5I. Personnel Selection, Training, and Evaluation

AD-A079 558/3 PC **A09**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Evaluation of Mess Management Specialist (MS) 'A' School Training by Advanced MS NAVEDTRACOM Students and by Fleet MS Personnel,
Eugene R. Hall, and Carol F. Denton. Oct 79, 190p Rept no. TAEG-76

Feedback information concerning Mess Management Specialist (MS) 'A' School training was collected from 65 MS personnel attending advanced courses within the Naval Education and Training Command (NAVEDTRACOM) and also from 82 MSs currently serving in fleet billets. A structured interview procedure was developed and evaluated for collecting data. Interviewees provided information concerning the degree to which typical 'A' School graduates were utilized on the job to perform 83 tasks for which the school provided training. Information was also obtained concerning the degree and specific nature of difficulty (ies) which recent graduates exhibit in performing the 83 job tasks. Comparisons made between data obtained within the NAVEDTRACOM and data obtained from fleet MS personnel showed that these sources provide equivalent feedback information. Similarly, MS personnel assigned to shore billets provide feedback data equivalent to that from personnel assigned to sea duty billets. (Author)

AD-A079 581/5 Not available NTIS
General Accounting Office Washington DC Federal Personnel and Compensation Div
Most Federal Employees on the Job 40 Hours or More Weekly: Tighter Controls Among Proposals for Those Who Work Less.
21 May 79, 119p Rept no. GAO/FPCD-79-24
Report to the Congress.
Availability: U.S. General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW. Washington, DC 20548 (No copies furnished by DTIC).

Contrary to widespread public perception, the vast majority of the Nation's 2.1 million Federal employees work at least the required 40 hours a week and adhere to lunch and coffeebreak rules. When time lost due to a small number of abusers is taken into account, taxpapers appear to be getting hundreds of millions of dollars of 'free' labor each year from the many Federal employees who regularly work extra time without compensation. GAO reached this conclusion after analyzing questionnaire responses from about 3,000 randomly selected employees at the 7 largest Federal agencies (collectively employing 70 percent of all civilian workers). GAO also observed employee work-hour practices and interviewed 238 personnel officers, supervisors, and union representatives in the 7 agencies in various locations across the country.

AD-A079 614/4 PC **A11**/MF **A01**
General Research Corp McLean VA Operations Analysis Group
Quantitative Procedure for Position Identity Definition.
Final rept.,
Jack I. Posner, Norvin E. Rader, Richard M. McElhiney, Henry C. Alberts, and Edward J. Schmitz. Dec 79, 227p Rept no. GRC-1071-01-79-CR
Contract DAAG39-78-C-0141

Working at the edge of the state of the art, GRC constructed a decision logic and quantitative methodology to properly designate each active Army position for incumbency by personnel in one of four categories: commissioned officer, warrant officer, enlisted, or civilian. The product of this research study provides the Army with a substantively improved approach to the proper determination of manpower category. A more credible, regularized, and objective basis for justification of manpower requirements by category, taking full account of managerial, fiscal, and manpower force constraints, is established by the methodology presented in this report. (Author)

AD-A079 636/7 PC **A05**/MF **A01**
Applied Science Associates Inc Valencia PA
Maintenance Training Simulators Design and Acquisition: Summary of Current Procedures.
Interim rept. Jul 78-Feb 79,
George R. Purifoy, Jr., and Eugene W. Benson. Nov 79, 88p AFHRL-TR-79-23
Contract F33615-78-C-0019

This technical report is the first in a series that will explore the problems of maintenance training simulation design and acquisition. It is focused on the existing procedures followed by Air Force personnel in performing Instructional Systems Development (ISD) analyses to define maintenance training equipment requirements, and by System Program Office (SPO) Training Equipment Acquisition Managers in accomplishing training equipment procurement. Later reports in this series will structure appropriate functional specifications for the acquisition of maintenance training simulators, will present handbooks to guide ISD analysts in selecting appropriate types of maintenance training equipment and in designing and documenting required maintenance training simulator characteristics and features, and to guide SPO Acquisition Managers in preparing Prime Item Specifications. In this report both the ISD and SPO procedures are described as they are currently accomplished. Relevant documentation is cited and a comprehensive bibliography is included. For each of the two sets of procedures, a general decision model is presented as a reference, and general problem areas which appear to be degrading the ultimate cost-effectiveness of maintenance simulators are discussed. (Author)

AD-A079 677/1 MF **A01**
Westinghouse Electric Corp Hunt Valley MD
Operational Consequences of Literacy Gap.
Final rept.,
J. Douglas Kniffin, Calvin R. Stevenson, George R. Klare, Eileen B. Entin, and Sharon L. Slaughter. Nov 79, 66p AFHRL-TR-79-22
Contract F33615-77-C-0048
Prepared in cooperation with McDonnell Douglas Astronautics Co., St. Louis, MO., Contract F33615-78-C-0022 and Ohio Univ., Athens.
Availability: Microfiche copies only.

Air Force managers and supervisors often face problems caused by reading difficulties among their personnel. These usually appear to be a joint of level function of reading skill of the personnel and level of difficulty of the materials they face. The term 'literacy gap' refers to the difference between the two levels. This study proposed to examine the effects upon reading comprehensive and preferences of three sizes of literacy gaps. This study involved three independent variables: Air Force personnel at tested reading grade levels (RGLs) of 8 and 10; Air Force job related materials, written at literacy gaps. A gap of -2, for example, meant that the materials were two grade levels harder than the tested reading ability of the subjects. An additional question of interest was whether increasing the time allocated for reading would mitigate the effect of large literacy gaps. Thus, reading times of 30, 45, and 60 minutes were examined. Subjects were Air Force personnel at two levels of reading ability, 8th and 10th grades. Multiple choice tests of comprehension were prepared. The following recommendations for the Air Force were made: (a) before major efforts are undertaken to rewrite Air Force materials for greater ease of reading, it would seem expedient to determine how much a negative literacy gap influences actual job performance, (b) efforts to improve readability of materials should be directed at populations and situations where motivation and interest are unlikely to be high, and (c) while increasing reading time would seem to be a reliable and straightforward way to increase test comprehension, the results of this study indicated that the learning efficiency of this approach is not high.

AD-A079 685/4 PC **A02**/MF **A01**
Adjutant General'S Office (Army) Washington DC
Prediction of Effective Officer Performance.
Research study,
Louis P. Willemin. Jun 62, 15p Rept no. AGO-PRO-RS-62-3

The present research is an attempt to develop tests which not only will be predictive of officer performance in general, but which also will be predictive of performance in specific assignment areas. These tests will permit identification of potential officers with various abilities that relate to performance in military assignments. The research represents an attempt to evaluate the hypothesis that the generalist concept must now be modified to recognize unique officer abilities and thus achieve maximum utilization of officer talent. The research being conducted in the area of predicting officer performance is intended to answer the question: Is it possible to achieve an early identification of individuals who possess certain specific abilities which are effective in predicting performance in specific officer job areas. Research with such an objective is described as concerned with differential abilities or performance. The search is for abilities which relate to success in one job area but do not relate to success in a different job area. If carried to an extreme, one could hypothesize a separate configuration of abilities for each unique military assignment. Such an extreme approach is neither desirable nor feasible at the present time.

AD-A079 793/6 PC **A03**/MF **A01**
Public Research Inst Alexandria VA
The Unemployment Insurance Tax and Labor Turnover: Further Empirical Results.
Research contribution,
Frank Brechling. Nov 79, 35p Rept no. CRC-407
Contract J-9-M-0130
Continuation of Contract J-9-M-6-0103.

The research reported here is an extension of a previous enquiry by Brechling and Jehn into the relationships between labor turnover and the unemployment insurance tax. First, the data base was extended through 1977, and the original models were re-estimated. The original and enlarged data sets yielded similar conclusions. Second, the influence of the taxable wage base of the social security tax upon labor turnover was examined. This taxable wage base seems to have a different impact from that of the taxable wage base of the unemployment insurance tax. Third, the relationships between the seasonal pattern of labor turnover and the unemployment insurance tax were examined. The results tended to be weak. Viewed as a whole, the results of the new investigation are not as strong as the original ones, but they do support the conclusion that there are significant relationships between labor turnover and the parameters of the unemployment insurance tax. (Author)

AD-A079 796/9 PC **A04**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
Boom Operator Part-Task Trainer: Test and Evaluation of the Transfer of Training.
Final rept. Jun 78-Apr 79,
Thomas H. Gray. Oct 79, 71p Rept no. AFHRL-TR-79-37

The report presents the rationale, methodology and results of a study of the training capabilities of the Boom Operator Part-Task Trainer (BOPPT), an air refueling simulator. The study was performed as part of an Air Force Initial Operational Test and Evaluation (IOT&E) of the device. Actually, three transfer of training sub-studies were conducted simultaneously: the first with undergraduate boom operators in the Combat Crew Training Squadron (CCTS) phase of instruction; the second with instructor boom operators in the Central Flight Instructor Course (CFIC); and the third with highly experienced boom operators who were maintaining essential skills. In the CCTS application, it was

found that all student groups trained in the BOPTT required significantly fewer air refueling attempts (50 versus 71) to reach proficiency in KC-135A air refueling skills than did conventionally trained students. In boom operations, procedures, and communications, the BOPTT trained students were equal or superior to the students in the standard syllabus. Also, proper utilization of the BOPTT could avoid over one million dollars in training costs per year.

AD-A079 809/0 PC **A05**/MF **A01**
Singer Co Binghamton NY Link Div
Advanced Low Cost G-Cuing System (ALCOGS).
Final rept.,
Jeffery M. Kleinwaks. Jan 80, 77p AFHRL-TR-79-62
Contract F33615-76-C-0060

The G-seat is a device that replicates in a flight simulator the pilot/seat interaction due to aircraft acceleration. The G-suit and seat shaker systems provide important cues to the pilot used in the control of the aircraft. These cues are believed to be particularly significant in high performance tactical aircraft. In order to investigate G-cuing philosophies and drive schemes, a system was developed with capabilities exceeding that of present G-cuing systems, which will allow the determination of how to obtain the maximum benefit from these cuing sources. The Advanced Low Cost G-Cuing System (ALCOGS) embodies the basic somatic capabilities of the first generation G-seat coupled with high response speed and system flexibility. ALCOGS combines G-seat, G-suit, and seat shaker systems into one integrated G-cuing system. (Author)

AD-A079 835/5 PC **A05**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Logistics Plans Career Ladder, AFSC 661X0.
Occupational survey rept.
Dec 79, 80p

The Logistics career ladder was created in March of 1970. Except for a very minor change which added the term 'plans' to the career ladder title, there have been no significant changes other than the creation of the Chief ENLISTED Manager (CEM Code 66100) in October 1978. This survey was initiated in response to a request from the Air Force Manpower and Personnel Center (AFMPC). Classification officials were interested in career ladder structure, job satisfaction, and other information pertinent to the management of the career ladder. This is the initial survey fo the career ladder.

AD-A079 836/3 PC **A06**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Weather Career Ladder, AFSC 251Xo/A.
Occupational survey rept.
Dec 79, 120p

This report is an occupational survey of the Weather career ladder (AFSCs 251X0/A) completed by the Occupational Survey Branch, USAF Occupational Measurement Center, in December 1979. The history of the Weather career field dates back to May 1951. From its inception until 1975, the career field consisted primarily of two separate ladders, Weather Forecasters (AFSC 253X0) and Weather Observers (AFSC 252X1). The observers were responsible for gathering weather data which forecaster personnel analyzed and used as the basis for their weather forecasts. The Forecasters formed a lateral career ladder with inputs from the Observer career ladder. In May 1975, a single career ladder was formed when the Weather Observer and Forecaster personnel merged into the AFSC 251X0 Weather career ladder.

AD-A079 902/3 PC **A10**/MF **A01**
Behavioral Evaluation and Training Systems Lubbock TX
Instructor Model Characteristics for Automated Speech Technology (IMCAST).
Final rept. 1 Jun-1 Dec 79,
Douglas C. Chatfield, Philip H. Marshall, and Charles F. Gidcumb. Oct 79, 214p NAVTRAEQUIPC-79-C-0085-1
Contract N61339-79-C-0085

This report examines the training characteristics of the Ground Controlled Approach (GCA) radar controller, the Landing Signal Officer (LSO) and the Air Intercept Controller (AIC). The expert and novice, in respect to these three tasks are contrasted in terms of their relative skills. The novice is characterized as a controlled serial-processing system, unable to effectively perform in a concurrent task environment wherein the tasks compete for the same pool of central resources. The expert on the other hand, is characterized as a resource efficient system capable of preprocessing and automatic responding. Several areas of basic research are reviewed in search of a set of technologies with which an instructor model, resident in an automated speech-recognition based training system, might be designed. Research in cognitive processing limitations and components are examined in some depth along with recent developments in intelligent knowledge-based computer assisted instruction (CAI). The result is an outline of the characteristics of a prototype instructor model.

AD-A079 937/9 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
He Fought on Damanskiy,
N. Zaytsev. 21 Aug 79, 9p Rept no. FTD-ID(RS)T-1095-79
Edited trans. of Voyennyye Znaniya (USSR) n6 p12, by Randy Dorsey.

No abstract available.

AD-A080 097/9 PC **A04**/MF **A01**
South Carolina Univ Columbia Center for Management and Organizational Research
A Cross Sectional Analysis and Generalizability Implications of a Military Attrition Model.
Technical rept.,
Stuart A. Youngblood, Bruce M. Meglino, William H. Mobley, and Dorothy P. Moore. Jan 80, 54p Rept no. TR-10
Contract N00014-76-C-0938

The generalizability of results of an earlier study of recruit training attrition are examined across three additional groups of recruits. A significantly different prediction equation for attrition was observed for one group containing lower quality recruits. Results support the general conclusions of the earlier study although many of the variables were not consistently significant across all four samples. Intention to complete enlistment, expectancy of completing enlistment, and internal motivation consistently differentiated graduates form attrites.

AD-B026 804/5 PC **A03**/MF **A01**
Human Resources Research Organization Alexandria VA
Instructional Technology in the Military.
Professional paper,
David S. Bushnell, Paul W. Caro, Saul Lavisky, Howard H. McFann, and John E. Taylor. Nov 76, 36p Rept no. HUMRRO-PP-2-76
Presented at the International Learning Technology Congress (1st) Jul 76, Washington, DC.
Distribution limitation now removed.

In July 1976, the National Security Industrial Association (NSIA) sponsored the First International Learning Technology Congress in Washington, D.C. As part of the Congress, NSIA also sponsored the Third Triennial Symposium on Cost Effective Learning Through the Application of Technology. One of the six sessions which made up the Symposium was devoted to the topic, 'Instructional Technology in the Military.'

ED-169 915 Not available NTIS
Designing Instructional Text,
James Hartley. 1978, 125p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Nichols Publishing Co., Post Office Box 96, New York. 10024 ($17.95).

General guidelines for the writers of instructional materials are provided, with emphasis on clarity in the presentation of textual information and related graphic aids. Some basic points about typographic planning are presented for typographers and printers, as well as writers, and it is suggested that some typographic practices may actually hinder rather than help users of the text. Examples of instructional text in their original state and then in revised versions illustrate the points made. More general issues discussed include the functions of illustrations, tabular materials and the like, and various alternatives to conventional prose for instructional text are proposed. More specialized issues, i.e., lecture handouts, bibliographies, indexes, and reference materials, are also discussed, as well as the problems of evaluating instructional text. A brief annotated bibliography is provided.

HRP-0026272/5 Not Available NTIS
National League for Nursing, Inc., New York.
Decision Making Within the Academic Environment.
1978, 63p
Available from the National League for Nursing, Ten Columbus Circle, New York, NY 10019.

Factors affecting the decisionmaking process in academic institutions, including bureaucratic structures, poor channels of communication, and lack of faculty participation, are explored in these papers presented at a 1977 conference sponsored by the National League for Nursing's Council of Baccalaureate and Higher Degree Programs. Nine papers, organized according to the broad categories of factors in decisionmaking, and models for decisionmaking and strategies in their application, pertained to the following areas: institutional, personnel, personal, and economic factors; decisionmaking in the academic environment from the perspective of a school dean; factors affecting decisionmaking in academic nursing from the viewpoint of faculty; a model for decisionmaking within the academic community; a model for decisionmaking from the perspective of a dean of a baccalaureate nursing program; causes and effects of faculty unionism; strategies in the application of a model for decisionmaking; proposed strategies in model application; and predicted trends in faculty growth and their impact on decisionmaking. It is anticipated that there will be an increase in the size and complexity of collegiate nursing programs, an increase in nursing faculty prepared at the doctoral level, and a decrease in universitywide resources.

HRP-0027864/8 Not Available NTIS
Pennsylvania Univ., Philadelphia. School of Medicine.
Mandatory Continuing Medical Education. One Step Forward -- Two Steps Back.
Patrick B. Storey. 1978, 7p
Pub. in Federation Bulletin v65 n9 p259-265 Sep 78.

The issue of assurance of high-quality medical care to the public is being confused with the issue of mandatory continuing education for physicians, which has fostered a potential multimillion dollar market in entrepreneurial educational activity. Medical specialty societies, State medical societies, and State licensing boards have begun to require Physicians Recognition Award (PRA) credits for renewal of physicians' membership and relicensure. The award is given to physicians who can demonstrate that they invested 150 hours in an educational program over a period of 3 years. It is recommended: that State licensing boards rescind their PRA conditions for relicensure, that hospitals review more effective means of continuing education other than PRA, and that medical specialty boards not confuse the issue of physicians' competence with PRA credits. The importance to the profession, to medical education, and to the public of bringing continuing education under control is stressed, along with the necessity of distinguishing the issues of continuing education from those of public policy.

HRP-0028195/6 Not Available NTIS
Oklahoma Univ. Medical Center, Oklahoma City. Dept. of Psychiatry and Behavioral Sciences.
Curriculum Model in Substance Abuse -- Its Implications for Physician Assistant (PA) Training and Utilization.
Ronald S. Krug, and William D. Stanhope. 1978, 6p
Pub. in the P.A. Jnl. v8 n3 p164-169 Fall 1978.

Despite widespread abuse of alcohol and other drugs, a recent study found that only 0.6 percent of the physician assistant (PA) curriculum is devoted

to substance abuse, with 16 hours of classroom time being the average time reported. The Research Triangle Institute Report on nurse practitioners and PA's in drug abuse treatment suggests that there should be increased time allocations for instruction for PA's specifically directed toward the problem of substance abuse. The model curriculum discussed is an 8-week period that could be inserted into a clinical rotation block. Each Monday is assigned to seminars, and Tuesday through Friday is devoted to clinical experiences. In the clinics, mornings are assigned to one type of substance abuse program (narcotics, for example), and the afternoons to another type, e.g., alcohol abuse. A proposed calendar for each day of the 8 weeks is given in a figure. Four types of seminars could be provided: a cognitive seminar, to provide background knowledge; an administrative seminar, for administering substance abuse programs; and both didactic and practicum skills seminars, for the students to exercise those skills necessary for the clinic.

HRP-0028228/5 Not Available NTIS
Continuing Education and the Family Doctor.
Manne Berber. 1978, 4p
Pub. in Jnl. of the Irish Medical Association v7 n13 p434-437 29 Sep 78.

Two aspects of continuing education programs for general practitioners (GP's) in Great Britain are discussed: the types of activities most suited to GP's, and the effect of the overall structure of medical education in Great Britain on continuing education for this group. Besides professional courses and meetings, GP's can meet their own education needs by contact with colleagues, reading, tapes, and ward rounds. The GP himself must make the main choice as to which method suits his needs best. Unfortunately, middle-aged specialists and general practitioners in Britain may have a distorted view of general practice, viewing its practitioners as 'failed specialists'. On the other hand, practitioners who qualified after 1955 are more likely to have entered the field as a first choice. Because GP's work at the interface of the medical profession and the community, they are in an ideal position to judge the relationship between the two. In the future, Britain's undergraduate medical curriculum should incorporate mandatory family medicine training. Furthermore, continuing educational activities for general practitioners should be designed by the practitioners themselves.

HRP-0028802/7 Not Available NTIS
Pace Univ., Pleasantville, NY. Graduate School of Nursing.
Rethinking Diploma School and Collegiate Education.
Marjorie Ramphal. 1978, 4p
Pub. in Nursing Outlook v26 n12 p768-771 Dec 78.

The characteristics and quality of nursing education in hospital-based diploma schools are contrasted with those of collegiate schools of nursing. Under the apprenticeship mode of training in diploma schools, instructors were engaged in active ongoing practice, and under optimal conditions, could provide role modeling based on constantly developing clinical judgment and skill. Diploma schools provided a higher teacher/student ratio than is possible in a university setting, and much of the instruction time was spent in patient care. Unlike university students, diploma students can experience continuity of caregiving, collaboration with other caregivers, accountability, and knowledge of outcomes under an apprenticeship system. Collegiate education has the disadvantages of limited clinical experience, and participation in caregiving as an outsider to the health care system. While diploma school training provides a depth of experience conducive to the development of clinical judgment, university education provides theoretical and conceptual understanding. The tendency of the nursing profession to view the two types of education as irreconcilable opposites is criticized, and the need for integration of the best facets of each is stressed.

HRP-0028815/9 Not Available NTIS
Beth Israel Hospital, Boston, MA.
Physical Assessment for Nursing Leaders.
Barbara McLain. 1978, 4p
Pub. in Jnl. of Nursing Administration v8 n12 p47-50 Dec 78.

A continuing education program of physical assessment training for nurses in leadership positions who lack some of the skills of more recent graduates is described. The program, developed for head nurses at Beth Israel Hospital in Boston, Mass., was created in response to reported difficulties resulting from their lack of physical assessment skills. Such problems included an incomplete understanding of patients' medical conditions, difficulty in assessing patients' conditions, and a discrepancy between the skill levels of head nurses and recent graduates. The program was limited to head nurses and was intended to impart only a selection of physical assessment skills. Examinations of mental status, thorax and lungs, heart and circulatory system, abdomen, skin, and breasts were included. Didactic presentations, practice with fellow students, and clinical practice under supervision by a physician were the components of the course. A sample of the clinical evaluation form developed for each body system covered is presented. Problems with the course included the unsatisfactory performance or the unavailability of the physician preceptors when needed (they were replaced with nursing faculty), and the initial anxiety of nurses regarding their ability to master the course material. The program has resulted in increased use of physical assessment skills in nursing practice and increased confidence among the head nurses who participated.

HRP-0030458/4 Not Available NTIS
Handbook of Health Education.
Peter M. Lazes. 1979, 430p
Available from Aspen Systems Corp., 20010 Century Blvd., Germantown, MD 20767.

Steps that individuals and communities can take to improve their health are presented in a handbook that explores a variety of health education programs and successful strategies for achieving them. Among the specific topics discussed are the way in which a Minnesota hospital integrated health education services into routine patient care; a hospital-based health education program in a community setting; health education in schools (particularly preschools) and in health maintenance organizations; approaches to maximizing the effectiveness of programs dealing with changing consumer dental health behavior; job safety and health, with attention to the role of health systems agencies; and community organization. The remainder of the handbook focuses on action tools needed to effect changes, including: the media and simulation gaming; self-care; legal priorities; and consumer perspectives. The appendix contains a listing of books, periodicals, and groups potentially of help in developing practical, realistic programs.

HRP-0030576/3 Not Available NTIS
National League for Nursing, Inc., New York.
Working Paper of the National League for Nursing (NLN) Task Force on Competencies of Graduates of Nursing Programs.
1979, 15p
Available from the National League for Nursing, Ten Columbus Circle, New York, NY 10019.

A task force was appointed by the National League for Nursing in 1978 to delineate competencies of graduates from four types of nursing education programs (practical, associate degree, diploma, and baccalaureate). Statements of competencies and characteristics for each type of educational program were reviewed, and commonalities and differences were identified. A model was devised to assess differences in the knowledge base, practice role, and evaluation components of the nursing process for graduates. It was found that differences exist in the knowledge base of each program, in the practice role of graduates, and in the accountability of graduates, and that minimal expectations (competencies) derived from the knowledge base and the practice role exhibit differences in the application of nursing practices. It was further ascertained that each type of program is based on a theory of nursing. Four components of the nursing process, including assessment, planning, implementation, and evaluation are inherent in all programs even though these components differ with regard to the extent and depth of implementation. A bibliography and tables reflecting competencies of nurse graduates from practical, associate degree, diploma, and baccalaureate programs are provided.

HRP-0030728/0 Not Available NTIS
Medical Mystery -- The Training of Doctors in the United States.
Steven Jonas. 1978, 426p
Available from W. W. Norton and Co., 500 5th Ave., New York, NY 10036.

Reform of the health care system and the centrality of physicians in the system are considered. Difficulties in the delivery of health care stem from: rising costs, financial barriers to care, physician overspecialization, geographic maldistribution of facilities and manpower, unnecessary hospitalization and surgery, defects in the quality of care, poor communication between providers and patients, and emphasis on curative medicine at the expense of preventive medicine. Even though physicians constitute less than 10 percent of the health care work force, the functioning of the entire health care system revolves around their work. Medical schools strongly influence the nature of medical practice. Problems in medical education include: a lack of concern or involvement with disease prevention, stress on research and rare diseases rather than on common problems, emphasis on hospital practice rather than on ambulatory practice, little concern with team practice and the proper use of other health professionals, overemphasis on basic medical sciences, and poor training in physician-patient communication and care. The education and practice of physicians are examined in relation to health, disease, illness, as is the Government's role in health care, health care institutions and personnel, quality control, medical licensure, and health-oriented physician education. Appendixes contain additional information on medical education. Notes, a bibliography, and an index are included.

PB80-131873 PC **A14**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Index of Federal Labor Relations Cases.
Oct 79, 303p OPM/OLMR-79-11

The issue updates the July 1979 Index of Federal Labor Relations Cases to October 1, 1979. It contains case determinations of the Federal Service Impasses Panel, Federal Labor Relations Authority, Federal Employees Appeals, Comptroller General, Federal Labor Relations Council, and the Assistant Secretary for Labor-Management Relations.

PB80-133978 PC **A05**/MF **A01**
Calspan Field Services, Inc., Buffalo, NY.
Training Program for Accident Investigation and Coding in the National Crash Severity Study.
Final rept.,
John W. Garrett. Jun 78, 100p CALSPAN-ZP-6003-V-3, DOT-HS-805 202
Contract DOT-HS-6-01442

An accident investigation and coding training program for personnel in the National Crash Severity Study is described in this report. The program was a two-day session for working investigators in that study. Two training films, one on scene investigation and one on vehicle evaluation, were also produced. Major emphasis in the program was on scene investigation and documentation, vehicle evaluation and documentation, rating the Collision Deformation Classification and AIS/OIC injury scales, photography, and use of the CRASH program.

PB80-135536 PC **A04**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
A Work-Sample Approach to Selection for Upward Mobility Positions.
Final rept.,
Charles N. MacLane. Aug 79, 67p TS-79-2

In the study, a system for selecting candidates for an upward mobility position--Claims Technician in the then Bureau of Retirement, Insurance and Occupational Health (BRIOH), United States Civil Service Commission--was created. Since there were no incumbents and no existent job analysis, the higher-level Claims Examiner job was analyzed to separate out the functions which the Claims Technician would perform. The primary selection

instrument was a work-sample test in which items written by Subject Matter Experts were linked to elements of the job and to tasks performed on the job. Self- and supervisory-assessment forms were also developed. The selection measures were administered to 86 applicants. Reasonable reliability was demonstrated for the work-sample test and significant convergence was found between the work-sample total scores and the self-assessment total scores.

PB80-137367 PC **A09**/MF **A01**
Pittsburgh Univ., PA. Inst. for Research on Interactions of Technology and Society.
The Regional and Sectoral Mobility Response Characteristics of the Engineering and Scientific Labor Force: 1968-1974.
Final rept. 1968-1974,
Patrick Doreian, Norman P. Hummon, Donald Musa, and George O. Rogers. 1 Sep 78, 191p
Grant NSF-SRS77-21882

This is a study of the regional mobility processes and sectoral mobility processes of engineers and scientists. Markov chains and a modeling strategy which disaggregated the transition matrices were the prime tools used in the study to define mobility characteristics. Parameters used define the various probabilities of mobility which include: age, employment status, salary, place of birth, and sex.

PB80-137433 PC **A04**/MF **A01**
National Rural Center, Washington, DC.
Large-Scale Federal Construction Projects and the Rural Employment and Economic Development Process. Recommendations for Public Policy.
Final rept. 1 Feb 78-31 Jan 80,
Thomas E. Till. 31 Jan 80, 56p DLMA-21-11-76-06-2
Contract DL-21-11-76-06

The report presents policy recommendations resulting from a four-year demonstration to help rural minorities and poor people obtain high-paying construction jobs on large, federally-financed projects in their areas. Special outreach efforts, training in construction craft skills by the unions, and affirmative action monitoring were employed on six case-study sites in the Southeast and Southwest. The report also contains recommendations for furthering local economic development by increasing the number of jobs induced by the project, and strengthening employment linkages to local disadvantaged people. The recommendations relate to the employment and development programs of many federal, state and local agencies, as well as community development groups.

PB80-137771 PC **A04**/MF **A01**
National Rural Center, Washington, DC.
Citizen Groups and Rural Jobs, An Information Handbook. Rural Employment Outreach Project.
Final rept. 1 Feb 78-31 Jan 80,
Marilyn J. Scurlock, and Kenny Johnson. 31 Jan 80, 58p DLMA-21-11-76-06-4
Contract DL-21-11-76-06

The handbook describes the activity and research inferences of a four year experimental and demonstration project designed to increase the number of local, minority, and/or disadvantaged persons employed on government financed construction projects in rural areas. Project activities centered on six rural Southern sites, where the National Rural Center acted as a facilitator, disseminator of information, and monitor of the implementation of affirmative action programs for the recruitment and training for employment of minority, female, and/or economically disadvantaged persons.

PB80-137813 PC **A04**/MF **A01**
California Univ., Santa Barbara. Community and Organization Research Inst.
Race, Labor Turnover, and Male Earnings.
Final rept. Jul 78-Dec 79,
George J. Borjas. 15 Dec 79, 58p DLETA-21-06-78-47-1
Grant DL-21-06-78-47

The research analyzes the link between racial differences in labor turnover and the racial wage differential among young and mature men. Several empirical findings of general interest were obtained. First, white separation rates are greater than black separation rates among young men. Moreover, regardless of the turnover event a young man chose, the monetary gains to that event were systematically higher for white men. These results imply that the racial wage differential among young men depends significantly on the racial turnover differentials. Among mature men, the existing wage differential does not depend significantly on racial labor turnover differences occurring in that age range. The samples analyzed were the Young Men and Mature Men National Longitudinal Surveys.

PB80-137821 PC **A03**/MF **A01**
Mathematica Policy Research, Inc., Princeton, NJ.
Benefit-Cost Analysis of Apprenticeship Training: Selected References.
Final rept.,
Charles D. Mallar, Emmanuel A. Noggoh, Karen A. Solomon, and Craig V. D. Thornton. 27 Nov 79, 48p DLMA-20-34-79-35-1
Contract DL-20-34-79-35-1

The bibliography contains references to published material that would be useful in the design of a benefit-cost methodology for studying apprenticeship programs. References were generally limited to the period 1968 - 1979 and are grouped in the following sections: (1) Descriptive Material on Apprenticeship Programs; (2) Demand for Apprenticeship and Journeyworkers; (3) Impacts of Apprenticeships on Participants; (4) Data Sources on Apprenticeship Programs; (5) Costs of Apprenticeship Programs; (6) Policy Issues Regarding Apprenticeships; (7) Miscellaneous Publications on Apprenticeships; (8) Benefit-cost Analysis.

PB80-137904 PC **A05**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
Methodological Approach to 1977/78 New Entrants Surveys.
Methodological rept. 1978,
George K. Schueller. Apr 79, 118p
Grant NSF-SRS77-27560
See also report dated 1976, PB-265 682.

The report documents the methodological approach used in the implementation of the New Entrants Surveys, administered to a sample of scientists and engineers who received bachelor's and master's degrees during the academic years 1972 and 1976.

PB80-138555 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
The Navy's Shore Requirements, Standards, and Manpower Planning System (Shorstamps)--Does the Navy Really Want It.
7 Feb 80, 49p FPCD-80-29

The Navy needs over half its personnel for its shore establishments, yet it has not had a manpower planning program which has been acceptable to the Congress. A system to meet this need is underway, but unless additional funds and people are used, it is unlikely that it will be implemented before 1992. On October 22, 1979, the Navy provided the Congress with a plan of action and said that important corrective actions had been made.

PB80-138639 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
Supply and Demand V: Studies of the Mobility of Scientists and Engineers.
Final rept.,
Lee Grodzins. Dec 79, 56p
Grant NSF-SRS77-20720

The mobility of doctoral scientists and engineers is examined through the data collected in 1973, 1975, and 1977 Surveys of Doctoral Scientists and Engineers in the United States. It is shown that emerging fields are formed by conditions of doctorates from traditional fields. The trends in mobility show the effects of the recession in employment in chemistry and physics and the onset of problems in the biosciences.

PB80-138894 PC **A06**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
An Evaluation of the Intergovernmental Personnel Act of 1970.
Report to the Congress.
19 Dec 79, 109p FPCD-80-11

The Intergovernmental Personnel Act of 1970 is aimed at resolving problems at the State and local levels in many areas--from building personnel management systems where none existed, to promoting civil service reform. However, the Office of Personnel Management needs to better identify these problems so that program administration can be improved. Several actions already initiated or planned by the Office of Personnel Management, if properly implemented, should help toward this end.

PB80-139983 PC **A02**/MF **A01**
Department of Labor, Washington, DC. Library.
The Role of Labor Unions in the United States: Selected References.
Bibliography rept. 1940-78,
Elizabeth K. Van Staaveren. Apr 78, 25p USDL-LIB-79-03

The bibliography presents references to materials relevant in a consideration of the appropriate and changing role of labor unions in the American free enterprise system, and the appropriate role of government. Sections in the bibliography are: The Role of Labor Unions in the United States (general material); Labor Unions and Labor Relations (General References); Collective Bargaining; Strikes; Textbooks and Collected Readings on Labor Relations; The Role of Government in Labor Relations.

PB80-140387 PC **A02**/MF **A01**
Department of Labor, Washington, DC. Library.
Affirmative Action and Seniority: Selected References.
Bibliography rept. 1974-Feb 79,
India D. Powell. Feb 79, 13p USDL-LIB-79-04

The bibliography contains a selection of references to books and articles on the subject of affirmative action and seniority. Most of the references are annotated. The bibliography addresses the legal aspects of the controversy between affirmative action and seniority. Reverse discrimination and the impact of affirmative action on equal opportunity employment are referenced.

PB80-928201 PC **E02**
Central Intelligence Agency, Washington, DC.
The Chinese Ministry of Foreign Trade; a Reference Aid.
Wall chart.
Jan 80, 11p CR-80-10343
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

The chart lists the organization and leading personnel of the Chinese Ministry of Foreign Trade.

5J. Psychology (Individual and Group Behavior)

AD-A079 541/9 PC **A05**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Relationship Between Perceptions of Role Stress and Individual, Organizational, and Environmental Variables.
Final rept.,
Leanne E. Young, James A. Riedel, and John P. Sheposh. Dec 79, 97p Rept no. NPRDC-TR-80-8
See also Rept. no. NPRDC-TR-79-9, AD-A066 190.

The present study investigated the relationships between various individual and organizational variables and perceptions of role stress. Role stress can be of two types: (1) role conflict, which results when an individual has incompatible demands made upon him; and (2) role ambiguity, which exists when an individual is uncertain of what is expected of him. Questionnaires designed to measure role stress, organizational climate, job characteristics, values, managerial practices, and organizational effectiveness were administered to a

sample of 1607 employees drawn from all hierarchical levels at four Public Works Centers (PWCs) in the U.S. (including Pearl Harbor), the PWC in Yokosuka, Japan; and the PWC at Subic Bay, Philippines. Results revealed that (1) workers perceived more role ambiguity than supervisory personnel; (2) perceptions of role stress differed across cultures, but differences were not related to specific cultural values; (3) role stress was related to organizational climate, job characteristics, and managerial and supervisory practices; (4) role ambiguity was more strongly related to organizational climate and general job characteristics, whereas the role conflict was more strongly related to specific job characteristics; (5) role ambiguity, unlike role conflict, was a substantial contributor in predicting intrinsic satisfaction; and (6) role ambiguity was related to workers' perceptions of work center performance. (Author)

AD-A079 630/0 PC **A03**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Role Affiliation and Attitudes of Navy Wives.
Final rept. May 76-Apr 77,
Patricia J. Thomas, and Kathleen P. Durning. Jan 80, 33p Rept no. NPRDC-TR-80-10

The purposes of this study were to investigate Navy wives' acceptance of social obligations associated with a military career, to measure their attitudes toward the increased utilization of Navy women, and to determine whether they hold traditional or contemporary beliefs about the role of women. A questionnaire was designed and administered to 463 wives associated with aviation commands throughout the Pacific. Items on women's role (WR) were also administered to a sample of 482 Navy active duty women. In the analyses, comparisons were made between responses of officers' wives (OW) and enlisted men's wives (EW), and between responses of Navy wives and Navy women. Also, analyses were conducted to see how responses related to education, number of children, employment status, years with the Navy, and age. Responses of OW and EW to items measuring attitudes toward social life and military commitment were very similar. Only four of the 28 questions yielded significant differences. The feminine role orientation of the two groups of wives was similar, half subscribing to a contemporary role, 40 percent choosing a traditional role, and 10 percent undecided. OW, however, gave fewer traditional responses to WR items than did EW.

AD-A079 701/9 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Unities in Inductive Reasoning.
Technical rept. no. 18, 1 Jul-30 Sep 79,
Robert J. Sternberg, and Michael K. Gardner. 1 Oct 79, 64p Rept no. RR-4-79
Contract N00014-78-C-0025

Two experiments sought to discover sources of communalities in performance on three inductive reasoning tasks: analogies, series completions, and classifications. In Experiment 1, 30 subjects completed an untimed pencil-and-paper test in which they were asked to solve 90 induction items, equally divided among the three kinds of induction items noted above. The subjects' task was to rank-order four response options in terms of their goodness of fit as completions for each particular item. Data sets for the three tasks were highly intercorrelated, suggesting the possibility of a common model of response choice across tasks. Moreover, a single exponential model of response choice provided a good fit to each data set. The single parameter estimate for this model was roughly comparable across tasks. In Experiment 2, 36 subjects completed a timed tachistoscopic test in which they, too, were asked to solve 90 induction items, equally divided among the three kinds of induction items noted above. The subjects' task was to choose the better of two response options as a completion for each particular item. Data sets for the three tasks were again highly intercorrelated, suggesting the possibility of a common model of real-time information processing across tasks. Moreover, a single linear model of response times provided a good fit to each data set. Three of four parameter estimates for this model were roughly comparable across tasks.

AD-A079 760/5 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Components of Human Intelligence.
Technical rept. 1 Jul-30 Sep 79,
Robert J. Sternberg. 1 Oct 79, 65p Rept nos. RR-5-79, TR-19
Contract N00014-78-C-0025

A theory of human intelligence is presented that is based upon the construct of the component. Components differ in their levels of generality (general, class, specific) and in their functions. Metacomponents are higher-order control processes that are used in planning how a problem should be solved, for making dicisions regarding alternative courses of action during problem solving, and for monitoring solution processes. Performance components are processes that are used in the execution of a problem-solving strategy. Acquistion components are processes used in learning new information; retention components are processes used in retrieving previously stored information; transfer components are processes used in generalization, that is, in carrying over knowledge from one task or task context to another. A mechanism for interaction among components of different kinds and multiple components of the same kind permits an account of certain interesting aspects of laboratory and everyday problem solving.

AD-A079 761/3 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
The Construct Validity of Aptitude Tests: An Information-Processing Assessment.
Technical rept. 1 Jul-30 Sep 79,
Robert J. Sternberg. 1 Oct 79, 51p Rept nos. RR-6-79, TR-20
Contract N00014-78-C-0025

This article presents an information-processing assessment of the construct validity of aptitude tests. It proposes that aptitude tests have been rather successful because they do possess high construct validity, although the constructs in terms of which the tests may be most profitably understood are information-processing rather than psychometric ones. Certain inconsistencies in the constructs proposed by alternative psychometric theories of aptitudes are proposed to disappear when these constructs are understood in terms of more basic information-processing constructs. (Author)

AD-A079 762/1 PC **A05**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Evaluation of Evidence in Causal Inference.
Technical rept. 1 Jul-30 Sep 79,
Miriam W. Schustack, and Robert J. Sternberg. 1 Oct 79, 81p Rept nos. RR-7-79, TR-21
Contract N00014-78-C-0025
Prepared in cooperation with Carnegie-Mellon Univ., Pittsburg, PA. Dept. of Psychology.

In three experiments, we investigated what evidence people use in making inferences about causality in complex and uncertain situations. Given evidence consisting of multiple observations of some outcome, with each observation including information about the presence or absence of that outcome and of some of its possible causes, subjects estimated the strength of the causal relationship between the outcome and a predetermined possibly-causal event. Over problems and over experiments, the nature and strength of evidence supporting the causal role of the hypothesized cause varied along many dimensions. Using regression-modeling, we found a set of five evidence types that together gave a good account of subjects' judgments. Four of the independent variables in this model directly concern the relation between the hypothesized cause and the outcome (confirmation by Joint Presence and by Joint Absence of target and outcome, and disconfirmation by violation of sufficiency and of necessity of the target for the outcome), and the fifth represents the goodness of alternative causes as explanations for the outcome. Over the experiments, involving four groups of subjects and five sets of problems, this single linear model accounted for 84 to 90% of the variance in each problem-set. (Author)

AD-A079 763/9 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Sociology
The Changing American Soldier: Work-Related Attitudes of U.S. Army Personnel in World War II and in the 1970s.
Research note,
David R. Segal, Barbara Ann Lynch, and John D. Blair. 1979, 17p ARI-RN-79-23
Grant DAHC19-77-G-0011
Pub. in American Jnl. of Sociology, v85 n1 p95-108 Jul 79.

No abstract available.

AD-A079 823/1 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Vigilance Performance of Men Sleeping under Arctic Conditions,
R. G. Angus, D. G. Pearce, A. G. C. Buguet, and L. Olsen. 1979, 5p Rept no. DCIEM-PUB-78X39
Availability: Pub. in Aviation, Space, and Environmental Medicine, v50 n7 p692-696 Jul 79 (No copies furnished by DTIC).

No abstract available.

AD-A080 015/1 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Color Defectives' Judgments of Signal Lights at Sea: A Replication.
Interim rept.,
Jo Ann S. Kinney, Helen M. Paulson, and Arthur N. Beare. 28 Jun 79, 10p Rept no. NSMRL-897

The ability of various types of color-defective men to judge colored lights at sea was tested on two separate occasions with comparable results. While color normals performed the task very well, color defectives on the average did not. Nevertheless, some individuals in almost all categories of defect did perform well and these individual differences were highly reliable. (Author)

AD-A080 065/6 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Medicine
Toward the Development of a New Selection Battery for Air Traffic Control Specialists.
Rept. for Jul 76-Apr 78,
James O. Boone. Sep 79, 40p Rept no. FAA-AM-79-21

In an effort to update and refine the selection battery for air traffic controllers, five experimental tests measuring aptitudes and skills considered important in air traffic work were administered to newly selected Air Traffic Control Specialist (ATCS) trainees on their first day of training at the FAA Academy in Oklahoma City. The testing covered a 21-month period from July 1976 to April 1978 and involved a final sample of approximately 2,500 new trainees. The five experimental tests and the five tests presently used by the Civil Service Commission (CSC) for selecting ATCS trainees were correlated with the averaged laboratory scores from FAA Academy training. These correlations were then employed in an iterative stepwise regression (stepdown procedure). The tests that made a significant contribution in predicting Academy socres were then used to form a composite and the multiple correlation was computed for the old test battery and the new battery. The new composite demonstrated a statistically significant increase in the multiple correlation over the old test battery. Use of the new test battery could result in a saving to the FAA in terms of Academy attrition due to failures. It could also aid in upgrading the quality of ATCS selectees and aid in mininmizing human error in air traffic control work. (Author)

ED-169 928 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
No Comparison. Children's Individuality: A Fact to Celebrate. Student Guide--Footsteps.
Rept. no. 2,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of

each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with some of the ways in which children differ, and how parents' responses to these differences can help or hinder the child's growth and development, is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents and future parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 929 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
The First Signs of April. The Need for Early Stimulation: A Sense of the World. Student Guide--Footsteps.
Rept. no. 3,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems (DHEW/OE), Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with how children use their senses to learn about the world, and why the first years of life are such a critical time for this exploration, is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 930 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Two to Get Ready. Preparing for Parenthood: Two Heads are Better Than One. Student Guide--Footsteps.
Rept. no. 4,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 20202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on the psychological preparation of prospective parents for parenthood is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents and future parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 931 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Who Is Sylvia. Children and TV: Watch It. Student Guide--Footsteps.
Rept. no. 5,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program exploring both the harmful and helpful aspects of television viewing for children is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 932 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
And We Were Sad, Remember. Dealing with Death: The Time Is Now. Student Guide--Footsteps.
Rept. no. 6.
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with what young children need to know about death and how parents can help them deal with it is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 933 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Love Me and Leave Me. Attachment and Independence: You Can't Have One without the Other. Student Guide--Footsteps.
Rept. no. 7,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on the relationship or bond between parent and child discusses how this bond forms, how it affects the development of the child, why children find it hard to separate from their parents and how they deal with the separation fears, and provides some practical suggestions for making inevitable separations less upsetting for the child. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 934 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Spare the Rod. Discipline: The Long and Short of It. Student Guide--Footsteps.
Rept. no. 8,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 20202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program on discipline gives some perspective to the subject and some of the different discipline techniques available to parents, as well as guidelines for deciding among the different techniques. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the

needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 935 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
What's Cookin'. Nutrition: It's Habit-Forming. Student Guide--Footsteps.
Rept. no. 9,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with how young children acquire their food likes and dislikes, their feelings about food, and their patterns of eating, discusses how parents can help their children develop good nutrition habits and provides some basic nutrition information for the whole family. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 936 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
True Blue. Play and Fantasy: The Child's Building Blocks. Student Guide--Footsteps.
Rept. no. 10,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.85 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with shy children put so much energy into play, what play means to them, and what they learn from it, provides suggestions for what parents can do to encourage and support this important aspect of their children's growth. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 938 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
The Secret of Little Ned. Listening to Children: Children Should Be Seen and Heard. Student Guide--Footsteps.
Rept. no. 12,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on listening as a way for parents to get to know their children and show them that they care discusses the different ideas and feelings young children have to talk about, the ways in which they express their concerns, and how parents can hear and respond to both their verbal and nonverbal messages. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 939 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
The Accident. Parenting Styles: Avoiding the Extremes. Student Guide--Footsteps.
Rept. no. 13,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20. $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program on styles in parenting discusses how attitudes toward childrearing have changed over the past 50 years, how children are affected by some extreme approaches to childrearing, and how a parenting style that is neither overpermissive nor overprotective is most likely to enhance children's growth. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 940 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
New Kid on the Block. Social Skills. Student Guide--Footsteps.
Rept. no. 14,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with how young children acquire social skills defines social skills and describes some ways that parents can build upon their child's desire to get along with people and learn these skills. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 941 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
The Scratching Pole. Growing Up: Children Do Their Best. Student Guide--Footsteps.
Rept. no. 15,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on the concept of developmental tasks, and how to interpret children's behaviors in terms of these tasks, is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 942 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Hairy Scary. Children's Fears: Face Them. Student Guide--Footsteps.
Rept. no. 16,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corpo-

ration), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with some of the fears young children have, and how their parents can help them cope with these fears, is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 943 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
There Comes a Time. Societal Support: We're All in It Together. Student Guide--Footsteps.
Rept. no. 17,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on things parents need in order to do a good job raising their children and some resources that are available to meet these needs, as well as things that society still needs to do to meet its responsibility to children and parents, is designed around a magazine format to allow maximum flexibility to different groups using the materials. The guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents and future parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 944 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Stacking the Deck. Competence: It's All in Your Mind. Student Guide--Footsteps.
Rept. no. 19,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on how children develop self-confidence or self-doubt and learn whether or not they are competent provides some guidelines and special activities for increasing competence in children. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related disucssion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 945 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
Christinitas. Creativity: A Fresh Look On the World. Student Guide--Footsteps.
Rept. no. 19,
Joanna Phinney. 1978, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with creativity in its broadest sense focuses on how people of all occupations and ages can think creatively, how children gain the ability to think and act in imaginative ways, and what parents can do to support this growth. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

ED-169 946 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
I'll Dance At Your Wedding. The Handicapped Child: A Child First. Student Guide--Footsteps.
Rept. no. 20,
Joanna Phinney. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20, $5.95 per kit); Reference Section, National Audiovisual Center, General Services Administration, Washington, DC. 20409 (Films and tapes only).

This student guide for a program concerned with the way handicapped children feel about themselves and the way others respond to them provides a brief introduction to the kinds of handicapping conditions, sources of help for handicapped children and their families, and suggestions for ways that parents can meet the special challenge of raising a handicapped child. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

HRP-0030203/4 Not Available NTIS
Colorado Univ. Medical Center, Denver. School of Nursing.
Conflict Resolution.
Ann Marriner. 1979, 5p
Pub. in Supervisor Nurse v10 n5 p46, 49, 52-54 May 79.

Types of conflict and the prevention of conflict through strategic and comprehensive planning in organizations are explored. Interpersonal conflict is inevitable in any field, including the field of nursing. Nursing supervisors can lessen its impact by coaching subordinates in assertive communication and fair fighting. Team development can serve to prevent and resolve conflict. The first step in team development involved planning and goal setting and prioritizing. After priorities have been established, role negotiation and the process of preventing role conflict, role ambiguities, and role overload are important. The next step in team development is determining who should be involved in decisionmaking and the nature of such involvement. Group building and group maintenance techniques can be utilized to focus on how people treat each other while accomplishing a task. Intergroup conflict can occur, however, and can be dysfunctional. The reduction of intergroup conflict can be accomplished by avoiding win-lose situations, emphasizing organizational goals and effectiveness, rotating personnel among groups, and increasing interaction and communication between groups. Organizational conflict often requires consultation for resolution. The duties of consultants are to analyze the organizational structure, to evaluate the leadership and authority of the institution, to assess communication patterns and the amount of intergroup cooperation or competition, to evaluate group norms and goals, and to examine group problemsolving and decisionmaking processes and various individual roles and functions within the group.

HRP-0030337/0 Not Available NTIS
Iowa Univ., Iowa City.
Anticipatory Socialization and Role Stress Among Registered Nurses.
Arthur P. Brief, Mary Van Sell, Ramon J. Aldag, and Nancy Melone. 1979, 6p
Pub. in Jnl. of Health and Social Behavior v20 n2 p161-166 Jun 79.

The effect of type of nursing education upon role stresses experienced in practice was investigated. It is suggested that each of the three types of preparation available for registered nursing leads to different role expectations, and that hospital practice does not differentiate between nurses according to their formal education, thus creating role stress for those who feel underutilized. It is also predicted that a longer period of work experience reduces the strength of the relationship between educational background and role stress. A random sample of 157 subjects drawn from a population of all registered nurses in Iowa working full time as hospital general duty nurses completed questionnaires. In addition, 117 supervisors of the respondents participated. Job activities did not differ according to educational track. Role stress levels were found to differ by educational track and to be negatively correlated with job satisfaction levels. The amount of job experience did not appear to affect the findings. Role stress and ambiguity levels were highest for baccalaureate degree nurses and lowest for hospital trained diploma nurses. It is concluded that anticipatory socialization processes during professional education define work roles.

PB80-138357 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Testing the Handicapped for Employment Purposes: Adaptations for Persons with Motor Handicaps,
Karen O. White. Sep 78, 21p PROFESSIONAL SER-78-4

The paper provides recommendations for test developers and examiners responsible for testing motor handicapped adults for employment purposes. Brief descriptions of some orthopedic, muscular and neuromuscular conditions are presented as well as information about language impairments which frequently accompany neurological disorders. A review of the relevant testing literature discusses the psychological, physical and psychometric considerations affecting the testing situation and presents some of the modifications suggested. Recommendations for the modification of examining procedures are based on the functional limitations of the applicant.

PB80-139975 PC **A05**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
The Rationale, Development, and Standardization of a Basic Word Vocabulary Test.
Vital and health statistics series.
Apr 74, 82p VHS/SER-2/60, DHEW/PUB/HRA-74/1334
Library of Congress catalog card no. 73-600251.

The rationale and development of the Basic Word Vocabulary Test are described in this report. The test was developed to provide a measurement instrument of word knowledge acquisition with two additional properties that are not extant in any other standardized vocabulary test. These two properties are reflected in its content representation (content validity) of a carefully specified population of words and in its range of application from about the third grade level of literacy to the highest level of word knowledge acquisition. These two properties permit assessment of a wide range of vocabulary development in terms of absolute level (as estimates of the word population) and relative standing in reference to various normative groups, i.e., age-education standing, on one continuous scale.

PB80-140286 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Parent Ratings of Behavioral Patterns of Children, United States.
Vital and health statistics series, 1963-65.
Nov 71, 66p VHS/SER-11/108, DHEW/PUB/HSM-73-1010
Library of Congress catalog card no. 74-610278.

The report contains information on specific behaviors, degrees of responsibility, traits, and use of 'leisure' time of children as rated by their parents. Data is given by age and sex.

PB80-142219 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta. Coll. of Industrial Management.
The Influence of Intervention Style, Information, and Social Context on the Persistence of Newly Introduced Behavior in Planned Change Contexts.
Final rept.,
Edward J. Conlon. 7 Dec 79, 133p DLETA-91-13-78-44-1
Grant DL-91-13-78-44

In a laboratory simulation of a planned change context, the participativeness of intervention style, positivity or negativity of group feedback and positivity or negativity of individual feedback on performance were varied in a factorial experimental design. The dependent variables were performance of a new behavior, valence of key outcomes and the social process indicators of cohesiveness and influence. Significant main and interactive effects were hypothesized and empirically investigated.

PB80-805724 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Human Aggression (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Mary E. Young. Mar 80, 99p
Supersedes NTIS/PS-79/0146, NTIS/PS-78/0204, and NTIS/PS-77/0217.

Aggression and violence in human behavior are reviewed in the reports cited. Topics include collective as well as individual behavior. (This updated bibliography contains 92 abstracts, 7 of which are new entries to the previous edition.)

5K. Sociology

AD-A079 664/9 PC **A04**/MF **A01**
Yale Univ New Haven CT School of Organization and Management
Diagnosing Race Relations in Management.
Technical rept.,
Clayton P. Alderfer, Charleen J. Alderfer, Leota Tucker, and Robert C. Tucker. 10 Jan 80, 74p
Rept no. CPA-80-1
Contract N00014-79-C-0626

This paper reports theory, process, results, and consequences of diagnosing the race relations among managers of a large industrial corporation. A four person diagnostic team consisting of a black female, black male, white female, and white male, aided by a twelve person advisory committee of similar race/sex composition, developed an organic questionnaire and administered it to more than 600 managers. Data were collected and analyzed on general race relations, management groups, hiring, advancement, firing, actions for change, and reactions to the study. Analysis showed that the state of race relations in the company was related to a variety of systemic conditions including the ideas and feelings of individuals, the perceptions and actions of key groups, and the structure of the whole organization. as a result of the diagnosis management committed itself to an action plan that addressed all the problematic issues uncovered by the diagnosis. (Author)

AD-A079 907/2 PC **A04**/MF **A01**
Yale Univ New Haven CT School of Organization and Management
Studying Intergroup Relations in Organizations.
Technical rept.,
Clayton P. Alderfer, and Ken K. Smith. 10 Jan 80, 74p Rept no. CPA-80-2
Contract N00014-79-C-0626

Research in organizational behavior includes a significant conflict between some studies that focus on the 'micro' processes of individual and small group behavior and others that address the 'macro' dynamics of organization-environment relations. Partially split between these two styles of research, the field lacks a theoretical framework and methodological procedure for dealing with multi-level phenomena and the tensions among levels of analysis. This paper presents theory of intergroup relations in organizations that deals with multilevel phenomena, derives methodological procedures for conducting intergroup research with organizations from the theory, reports data from two empirical studies pertaining to task group relations along a workflow and race relations among black and white managers, and formulates the concept of embedded intergroups to explain the phenomena uncovered in both studies.

AD-A080 032/6 PC **A06**/MF **A01**
Urban Inst for Human Services Inc San Francisco CA
Behavioral Criteria in Research and the Study of Racism: Performing the Jackal Function. Part II.
Technical rept. no. 1, 15 Mar 78-1 Jan 79,
Asa G. Hilliard, and Yolanda L. Jenkins. Nov 79, 109p
Contract N00014-77-C-0183

The first year of the project was spent in the design and implementation of the pilot study. The specific objectives of the pilot study were: (1) to test the validity of the conceptual model, (2) to refine the conceptual model, (3) to pilot test research instruments to determine their appropriateness for measuring behavioral expressions of racism, (4) to employ strategies that would elicit racially-specific behaviors, (5) to identify behavioral indicators of racism, (6) to specify configurations of racial legitimizing and delegitimizing behaviors (behavioral criteria) and the conditions under which they occur, and (7) to measure the impact of the slide presentation 'Return to the Source' by behavioral and attitudinal change. The first part of Technical Report II contains the description, assumptions, instruments, analyses and interpretation of results from the inter-ethnic relations pilot study. In part II, the legitimation coding scheme derived from the pilot study data is presented. The hypotheses, assumptions, research design, methods, statistical procedures for analysis of the present study are specified.

ED-169 937 Not available NTIS
Applied Management Sciences, Inc., Silver Spring, MD.
I Love You When You're Good. Loving Children: Getting the Message Across. Student Guide--Footsteps.
Rept. no. 11,
Sharon Barry. 1979, 17p
Prepared in cooperation with Educational Film Center, Springfield, VA.; Maryland Univ., College Park. Inst. for Child Study. Sponsored in part by Bureau of School Systems, Washington, DC. For related documents, see IR-007 212-233 and IR-007 396. Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from University Park Press, 233 East Redwood Street, Baltimore, MD. 21202 (Student Guide Kit, one of each program, 1-20. $5.95 per kit); Reference Section, National Audiovisual Center, GSA, Washington, DC. 20409 (Films and tapes only).

This student guide for a program focusing on how parents influence the development of self-worth and security in children points out that, even when their parents love them, children may be getting a different message, and suggests special things parents can do to help their children feel loved. Designed around a magazine format to allow maximum flexibility to different groups using the materials, the guide is divided into seven sections: (1) an overview of the theme and contents; (2) a summary of the major learnings of the theme; (3) feature articles containing the major content and including practical suggestions for parents; (4) a film review section which includes a synopsis of the accompanying film program and a related discussion question; (5) three activities aimed at both individual and group participation; (6) a selection of field activities, discussion questions, and research topics designed to reinforce the ideas presented in the articles and meet the needs of a wide variety of classroom groups; and (7) a bibliography for further reading on the theme.

PB80-127863 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Health Resources Div.
Restricting Trade Act Benefits to Import-Affected Workers Who Cannot Find a Job Can Save Millions.
Report to the Congress.
15 Jan 80, 81p HRD-80-11

The worker adjustment assistance program provides weekly cash payments, training, and employment services to workers whose employment is affected by import competition. GAO found that (1) weekly cash payments helped few adjust to changes in their economic conditions; (2) few workers used employment services for readjusting to new jobs even when laid off a long time; and (3) most workers did not receive benefits until long after they were laid off, in many cases after they had returned to work. The Congress should amend the Trade Act of 1974 to require that import-affected workers exhaust unemployment insurance benefits before receiving Trade Act cash benefits. This would lengthen the period of income protection for those who cannot find a job and could save millions of dollars now paid to the majority who return to work before exhausting unemployment insurance benefits.

PB80-129836 PC **A02**/MF **A01**
Duke Univ., Durham, NC. Center for the Study of Aging and Human Development.

Economics of a Stationary Population: Implications for Older Americans.
Executive summary,
Juanita M. Kreps, Joseph J. Spengler, Robert L. Clark, and R. Stanley Herren. Dec 76, 18p NSF/RA-761783
Grant NSF-GI-41002
See also PB-277 448.

Three research papers concerning population shifts are reviewed. The questions posed in these papers relate to the ways in which the movement toward zero population growth will affect the ratio of workers to retirees, and the impact of these changes in age composition on the productive capacity and the distributive patterns in the economy. Tentative conclusions indicate that there are serious problems associated with the expected population shifts, problems caused by an eventual decline in the proportion of the working age population and by the consequent necessity of making larger transfers of income from workers to retirees. These problems are intensified according to the extent that levels of living in retirement are raised, or the period of retirement is extended, or the age of entry to the work force is raised. Unless strong countermoves are initiated, it is felt that both the second and third prospects are likely. Given the expected rise in tax liabilities necessary to finance even the present levels of income transfers, there is a low probability of achieving any substantial improvement in real incomes during retirement. This research has identified some key policy issues and generated information for consideration of these issues.

PB80-131642 PC **A02**/MF **A01**
Duke Univ., Durham, NC. Center for the Study of Aging and Human Development.
Economic Implications for Older Americans of a Stationary Population, A Bibliography,
Juanita M. Kreps, Joseph J. Spengler, Robert L. Clark, and R. Stanley Herren. Dec 76, 20p NSF/RA-761781
Grant NSF-APR73-02885

The bibliography contains references to research studies that examine the potential shifts in the economic status of the elderly in relation to the changing age structure as the United States moves toward a stationary population. Studies that examine the effects of various public and private programs on the elderly and the impact of retirement policy are included.

PB80-132517 PC **A09**/MF **A01**
Lewin and Associates, Inc., Washington, DC.
Deinstitutionalization of Mentally Retarded and Other Developmentally Disabled Persons: Lessons from the Experience of Five States.
Final rept.,
Carolyn Harmon, Gayle Friday, Tom Joe, Valerie Bradley, and Mary Ann Allard. Jul 79, 182p
ASPE/P-76-115-SSHD
Contract DHEW-100-76-0214
Prepared in cooperation with Human Services Research Inst., Washington, DC.

The study identifies and evaluates five states that have taken a comprehensive approach to deinstitutionalization of the developmentally disabled. The purpose was to identify states which are leaders in systematic planning and operations for deinstitutionalization, to critically evaluate their efforts from a constructive point of view, and to document findings for use by other states interested in undertaking a deinstitutionalization program. Particular emphasis was given to evaluating state budgeting mechanisms, state planning mechanisms, and how local governments are organized to develop appropriate community residential facilities and services to developmentally disabled clients. This report summarizes and compares the experiences of five states--California, Connecticut, Minnesota, Georgia, and Pennsylvania--in deinstitutionalization and the development of community-based residential and support services for mentally retarded and other developmentally disabled persons.

PB80-132574 PC **A03**/MF **A01**
California State Dept. of Motor Vehicles, Sacramento. Research, Development and Consultation Section.

The Effectiveness of Accredited Traffic Violator Schools in Reducing Accidents and Violations,
Raymond C. Peck, Shara Lynn Kelsey, Michael Ratz, and Beverly R. Sherman. Sep 79, 44p
CAL-DMV-RSS-79-71

The effect on subsequent driving record of requiring traffic violators to attend classes at accredited schools rather than face the usual penalty measures was evaluated. When presented with a certificate of completion, the court usually then dismisses the violation, and no record of the offense is available to DMV or others. No significant difference in subsequent mean number of accidents or convictions was found between those subjects attending classes and those given waivers of attendance; additional runs on public vs. privately owned schools, and single 8-hour vs. several shorter sessions, likewise produced no significant evidence of interactions. Generalization is hampered by the selective nature of the schools studied; 60% of the courts contacted refused to allow subjects assigned to traffic violator schools to be placed in a no school control group. Thus, the study was restricted to 129 schools utilized by the 52 courts that agreed to cooperate. The authors recommend either discontinuing the DMV accreditation program or upgrading standards and improving the monitoring process.

PB80-136617 PC **A06**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Div. of Housing Research.
Experimental Housing Allowance Program. A 1979 Report of Findings.
Jerry J. Fitts, Terrence L. Connell, Howard M. Hammerman, Garland R. Christopher, and Edgar O. Olsen. Apr 79, 125p HUD-0000672

Findings as of April 1979 are reported for experimental programs in the Experimental Housing Allowance Program (direct cash payments to low - income families to aid them in obtaining adequate housing) in 12 different housing markets. Findings consistent across sites, particularly those common to the Demand and Supply Experiments, are emphasized. The following are key findings: (1) less than half of the income - eligible population receive payments, with many eligible nonparticipants being unwilling to make the housing repairs or moves necessary to qualify for payments; (2) a majority of eligible households live in substandard housing; (3) the larger the percentage of households living in substandard housing, the smaller the percentage that will participate in the program in that area; (4) standards and payments affect participation, raising minimum acceptable housing quality standards causes participation to drop substantially, and a substantial increase in payments causes participation to increase modestly; (5) if cash payments are not designated for housing, low - income families tend to allocate only small portions of their added income to housing expenditures; (6) payments must be tied to housing standards in order to assure that families live in safe, sanitary, structurally sound dwelling units; (7) mobility is determined less by payments than by other factors, such as nearness to relatives, friends, workplaces, schools, and neighborhoods which are familiar; (8) housing allowances have little effect on housing prices; (9) allowances do not stimulate new construction or major rehabilitation; and (10) the program costs about $1,150 annually per household ($900 in payments and $250 for administration in 1976 dollars). Statistics from which findings are derived are provided, with references and a selected bibliography. The appendix provides a background and description of the Allowance Program, a description of the design and review process, a summary of program operations, and a statement of housing standards.

PB80-136625 PC **A15**/MF **A01**
Department of Commerce, Washington, DC. Housing Div.
Annual Housing Survey: 1973. United States and Regions. Number 1: Financial Characteristics by Indicators of Housing and Neighborhood Quality.
Elmo E. Beach, Aneda E. France, and George Spraggins. Mar 76, 339p HUD-0000677

This is a supplement to the four basic volumes of the 1973 Annual Housing Survey for the United States. It contains 84 tables which cross - tabulate the income of occupants with such indicators of housing quality as value of the property, number of bathrooms and bedrooms, failures in plumbing facilities and equipment, completeness of kitchens, number of electrical outlets, electrical fuse blowouts, peeling paint and holes in the plaster, street conditions, and neighborhood services. Further breakdowns give data for households headed by blacks and for those headed by persons of Hispanic origin. The data were gathered by interviewers who visited a sample of 60,000 housing units located in the 243 standard metropolitan statistical areas in the United States. An extensive appendix explains the survey methodology, defines all terms used in the questionnaire, and reprints the 20 - page survey instrument. A second appendix explains the statistical handling of the data, quality control measures employed, and the reliability of the final survey results. In general, the statistics show that poor housing conditions are associated with low income, that more renters than owners report poor housing conditions, that households headed by black or Spanish - speaking persons are more likely to have low incomes and poor housing, and that housing quality varies greatly by region.

PB80-136633 PC **A11**/MF **A01**
Department of Commerce, Washington, DC. Housing Div.
Annual Housing Survey: 1973. United States and Regions. Part C: Financial Characteristics of the Housing Inventory.
Elmo E. Beach, Aneda E. France, and George Spraggins. 1976, 237p HUD-0000680

This portion of the 1973 Housing Inventory Survey cross - tabulates the income of occupants with a number of indicators of housing quality, including value of the property, number of rooms, condition of the property, street conditions, and neighborhood services. Tables and narration summarize the findings, while detailed statistical tables give breakdowns for each region of the United States and look at families which have either a black or Spanish - speaking head of household. In 1973, a total of 69,337,000 housing units were occupied. About 20.1 percent of these homeowners earned less than $5,000 annually compared to 34.4 percent of the renters; in the upper income category ($15,000 and over) the distribution was reversed with 32.5 percent of the owners in this group but only 13.7 percent of the renters. The characteristics of both the housing and the composition of the household varied greatly by income and value of home. Upper income homeowner households were predominately occupied by families with a male head of household and a wife present, while 42.2 percent of the lower income households contained just 1 adult. Children were much more common in the upper income owner households. Lower income renters also had a higher proportion of households headed by 1 person and this person was female in 18.9 percent of all 2 - or - more - person rental households. Children under 18 were found in 24.9 percent of low income and 38.3 percent of upper income rental households. Black and Spanish - speaking families were more likely to be poor and to rent. Tables give detailed statistical breakdowns while appendices contain study methodology.

PB80-136641 PC **A07**/MF **A01**
Department of Commerce, Washington, DC. Housing Div.
Annual Housing Survey: 1973. United States and Regions. Part D: Housing Characteristics of Recent Movers.
Elmo E. Beach, Aneda E. France, and George Spraggins. Nov 75, 148p HUD-0000681

As of October 1973, a total of 13,284,000 households, or about one out of five in the United States, had moved during the 12 months preceding the HUD Annual Housing Survey date. During the period April 1970 to October 1973, two out of five moved into their present residences and during the 14 - year period between January 1960 and the survey, 75 percent of all households had changed residence. Renters are four times more likely to move than owners, both within and between metropolitan statistical areas. About 3,162,000 of the recently - moved households have a different head, resulting from separation, divorce, death,

marriage, and persons establishing a new residence. About 64.8 percent of the 2,744,000 households with the same head who owned their previous homes are currently homeowners. For the 7,379,000 renters, the proportion is 72.5 percent. The South had the largest number of recently - moved households, 4,479,000 or 20.5 percent; the West had the highest proportion, 3,245,000 or 25.7 percent. The Northeast had 13.9 percent of recently - moved households and the North Central area 17.7 percent. Statistical tables give detailed breakdowns of the characteristics of these recently - moved households by age, income, race, type of housing, quality of housing, and moving patterns. Graphs illustrate the major findings, while appendices contain the survey questionnaire and methodology.

PB80-136658 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas. No. 1. Annual Housing Survey: 1975.
Summary rept.,
Elmo E. Beach, Edward D. Montfort, and Margaret W. Harper. Jul 78, 98p HUD-0000708
Paper copy available from the Sup. of Docs., Stock number 003-024-01582-0.

Summary statistics on housing and household information are presented from the Annual Housing Survey (AHS) conducted from October to December 1975 for each of the four U.S. geographic regions (West, North Central, Northeast, and South), and 21 selected standard metropolitan statistical areas (SMSAs) surveyed from April 1975 through March 1976. The AHS survey was designed to provide current information on the size and composition of the housing inventory, the characteristics of its occupants, the changes in the inventory resulting from new construction and from losses, the indicators of housing and neighborhood quality, and the characteristics of recent movers. The statistics are based on information gathered by personal interviews from sample units located in the counties and independent cities comprising the 461 sample areas used in current surveys of the Census Bureau. The tables show data for the U.S. and each of the four geographic regions, by inside and outside SMSAs. In addition, data inside metropolitan areas for the U.S. and regions are shown separately for 'in central cities' and 'not in central cities.' Similar separate data are shown for the largest SMSA in each of the four geographic regions. For the remaining 17 SMSAs, data are shown only for the SMSA as a whole. Two appendices are also included. The first appendix describes the geographic area classifications and provides definitions and explanations of the subjects covered. The second appendix presents information on sample design, estimation, and accuracy of the data.

PB80-136666 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Financial Characteristics by Indicators of Housing and Neighborhood Quality for Selected Metropolitan Areas. No. 2, Part 1; Northeast and North Central Regions. Annual Housing Survey: 1975.
Supplementary rept.,
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Dec 78, 696p HUD-0000709
Paper copy available from the Sup. of Docs., Stock number 003-024-01645-1.

This report presents supplemental cross - tabulations of financial characteristics by indicators of housing and neighborhood quality from the 1975 - 1976 Annual Housing Survey for selected metropolitan areas in the Northeast and North Central Regions. Some of the cities covered are Hartford, Conn.; Rochester, N.Y.; Chicago, Ill.; Columbus, Ohio; and Madison, Wis. Statistics are based on information from a sample of housing units, and are therefore subject to sampling variability. The tables show cross - tabulations of the indicators of housing and neighborhood quality by income, property value, and gross rent. Tables 1 through 4 present characteristics of owner - occupied and renter - occupied housing units by income of the family or primary individual; tables 5 through 8 present characteristics of owner - occupied, single family homes by value of property; and tables 9 through 12 present characteristics of renter - occupied housing units by gross rent. The same subject matter is presented for black housholds in tables 13 through 24 and for Hispanic households in tables 25 through 36. Data are intended to serve as broad indicators of housing quality and not as precise measurements. Personal interviews were the primary method used in obtaining data. Area classifications, definitions and explanations of subject characteristics, and source and reliability of estimates are appended.

PB80-136674 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Financial Characteristics by Indicators of Housing and Neighborhood Quality for Selected Metropolitan Areas. No. 2, Part 2; South and West Regions. Annual Housing Survey: 1975.
Supplementary rept.,
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Dec 78, 768p HUD-0000710
Paper copy available from the Sup. of Docs., Stock number 003-024-01646-0.

This report presents supplemental cross - tabulations of financial characteristics by indicators of housing and neighborhood quality from the 1975 - 1976 Annual Housing Survey for selected metropolitan areas in the South and West Central Regions. Some of the cities covered were Atlanta, Ga.; Miami, Fla.; San Antonio, Tex.; Colorado Springs, Colo.; and San Diego, Calif. Statistics are based on information from a sample of housing units, and are therefore subject to sampling variability. The tables show cross - tabulations of the indicators of housing and neighborhood quality by income, property value, and gross rent. Tables 1 through 4 present characteristics of owner - occupied and renter - occupied housing units by income of the family or primary individual; tables 5 through 8 present characteristics of owner - occupied, single family homes by value of property; and tables 9 through 12 present characteristics of renter - occupied housing units by gross rent. The same subject matter is presented for black households in tables 13 through 24 and for Hispanic households in tables 25 through 36. Data are intended to serve as broad indicators of housing quality and not as precise measurements. Personal interviews were the primary method used in obtaining data. Area classifications, definitions and explanations of subject characteristics, and source and reliability of estimates are appended.

PB80-136682 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
General Housing Characteristics. Part A. Annual Housing Survey: 1975. United States and Regions.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Apr 77, 254p HUD-0000711
Paper copy available from the Sup. of Docs., Stock number 003-024-01368-1.

Statistics on general housing characteristics from the 1975 Annual Housing Survey are presented. The survey, conducted inside and outside standard metropolitan statistical areas for each of the four geographic regions (West, North Central, South, and Northeast), was designed to provide a current series of information on the size and composition of the housing inventory, occupant characteristics, changes in the inventory resulting from new construction and from losses, indicators of housing and neighborhood quality, and characteristics of urban and rural housing units. A series of standard tables presents simple distributions of data for housing units for each area reported. The characteristics analyzed are specified in the finding guide list. They include such items as occupancy, vacancy, and utilization characteristics; structural and plumbing factors; equipment and fuels; and financial, household, mobile home, and trailer characteristics. Statistics presented in this report are based on a sample of housing units and are, therefore, subject to sampling variability. The designated sample consisted of approximately 79,900 housing units located throughout the United States. The information was obtained by questionnaires for units enumerated in the 1970 census and updated to include construction since that time. Particular care should be exercised in the interpretation of figures based on the relatively small numbers of sample cases as well as small differences in figures. Area classifications, definitions and explanations of subject characteristics, and source and reliability of estimates are appended.

PB80-136690 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Urban and Rural Housing Characteristics: Part E. Annual Housing Survey: 1975. United States and Regions.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Apr 77, 196p HUD-0000715
Paper copy available from the Sup. of Docs., Stock number 003-024-01369-0.

Statistics showing urban and rural housing characteristics are presented from the 1975 Annual Housing Survey for the United States and each of the four geographic regions. The survey was designed to provide information on the size and composition of the housing inventory, the characteristics of its occupants, the changes in the inventory resulting from new construction and from losses, the indicators of housing and neighborhood quality, the characteristics of recent movers, and the characteristics of urban and rural housing units. The statistics presented in this report are based on information from a sample of 78,000 housing units, collected by personal interview from October to December 1975. Shown in this report are medians, ratios, and percentages. Medians for rooms, persons, and years of school completed by head of household are rounded to the nearest tenth. Medians for selected monthly housing costs as percentage of income are rounded to the nearest percent. Numerous statistical data are provided, including information on the following subjects: general characteristics of the housing inventory, financial characteristics of the housing inventory, failures in plumbing facilities and equipment, selected neighborhood characteristics, and selected structural characteristics by deficiencies. Appendices include a facsimile of the Annual Housing Survey questionnaire.

PB80-136708 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas: Madison, Wisconsin. Standard Metropolitan Statistical Area. Annual Housing Survey: 1975.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Jun 77, 102p HUD-0000717
Paper copy available from the Sup. of Docs., Stock number 003-024-01375-4.

Housing and household characteristic statistics are presented from the 1975 - 1976 Annual Housing Survey conducted in Madison, Wis., one of 21 selected standard metropolitan statistical areas (SMSAs). These statistics are based on information collected by personal interviews from a sample of housing units. Tables contain the following information: general and financial characteristics of the housing inventory in 1970 and 1975; selected housing characteristics of new construction units for 1975; 1970 characteristics of housing units removed from the inventory in 1975; characteristics of owner - occupied and renter - occupied housing units; and financial characteristics of housing units (1970 and 1975) for black and Hispanic heads - of - household. Other topics covered which refer to owner - occupied and renter - occupied housing units incorporating 1975 data include: occupancy and utilization characteristics and services available; selected structural characteristics by deficiencies; failures in plumbing facilities and equipment; and selected neighborhood characteristics for all races as well as for black and Hispanic heads - of - household. In addition, tables provide information on income of families and primary individuals in both owner - occupied and renter - occupied housing units, the value of owner - occupied housing units, and the gross rent of renter - occupied housing units. These data are broken down additionally by black and Hispanic heads - of - household. The final tables contain selected char-

acteristics of all occupied housing units and of units occupied by recent movers by tenure. In addition, data are compared with previous years involving tenure and location of present units, tenure and units in structure of present units, age of household head and presence of persons over 65, tenure and number of bedrooms and plumbing facilities, tenure and persons per room, and value and gross rent of present unit. These statistics are also broken down according to race. Area classifications, and definitions and explanations of subject characteristics are appended, along with source and reliability of estimates and a facsimile of the Annual Housing Survey Questionnaire for 1975. Table - finding guides are also provided.

PB80-136716 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas: Atlanta, Georgia. Standard Metropolitan Statistical Area. Annual Housing Survey: 1975.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Sep 77, 295p HUD-0000718
Paper copy available from the Sup. of Docs., Stock number 003-024-01377-1.

Housing and household characteristic statistics are presented from the 1975 - 1976 Annual Housing Survey conducted in Atlanta, Ga., one of 21 selected standard metropolitan statistical areas (SMSAs). These statistics are based on information collected by personal interviews from a sample of housing units. Tables contain the following information: general and financial characteristics of the housing inventory in 1970 and 1975; selected housing characteristics of new construction units for 1975; 1970 characteristics of housing units removed from the inventory in 1975; characteristics of owner - occupied and renter - occupied housing units; and financial characteristics of housing units (1970 and 1975) for black and Hispanic heads - of - household. Other topics covered which refer to owner - occupied and renter - occupied housing units incorporating 1975 data include: occupancy and utilization characteristics and services available; selected structural characteristics by deficiencies; failures in plumbing facilities and equipment; and selected neighborhood characteristics for all races as well as for black and Hispanic heads - of - household. In addition, tables provide information on income of families and primary individuals in both owner - occupied and renter - occupied housing units, the value of owner - occupied housing units, and the gross rent of renter - occupied housing units. These data are broken down additionally by black and Hispanic heads - of - household. The final tables contain selected characteristics of all occupied housing units and of units occupied by recent movers by tenure. In addition, data are compared with previous years involving tenure and location of present units, tenure and units in structure of present units, age of household head and presence of persons over 65, tenure and number of bedrooms and plumbing facilities, tenure and persons per room, and value and gross rent of present unit. These statistics are also broken down according to race. Area classifications, and definitions and explanations of subject characteristics are appended, along with source and reliability of estimates and a facsimile of the Annual Housing Survey Questionnaire for 1975. Table - finding guides are also provided.

PB80-136724 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas: Chicago, Illinois. Standard Metropolitan Statistical Area. Annual Housing Survey: 1975.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Aug 77, 318p HUD-0000719
Paper copy available from the Sup. of Docs., Stock number 003-024-01382-7.

Housing and household characteristic statistics are presented from the 1975 - 1976 Annual Housing Survey conducted in Chicago, Ill., one of 21 selected standard metropolitan statistical areas (SMSAs). These statistics are based on information collected by personal interviews from a sample of housing units. Tables contain the following information: general and financial characteristics of the housing inventory in 1970 and 1975; selected housing characteristics of new construction units for 1975; 1970 characteristics of housing units removed from the inventory in 1975; characteristics of owner - occupied and renter - occupied housing units; and financial characteristics of housing units (1970 and 1975) for black and Hispanic heads - of - household. Other topics covered which refer to owner - occupied and renter - occupied housing units incorporating 1975 data include: occupancy and utilization characteristics and services available; selected structural characteristics by deficiencies; failures in plumbing facilities and equipment; and selected neighborhood characteristics for all races as well as for black and Hispanic heads - of - household. In addition, tables provide information on income of families and primary individuals in both owner - occupied and renter - occupied housing units, the value of owner - occupied housing units, and the gross rent of renter - occupied housing units. These data are broken down additionally by black and Hispanic heads - of - household. The final tables contain selected characteristics of all occupied housing units and of units occupied by recent movers by tenure. In addition, data are compared with previous years involving tenure and location of present units, tenure and units in structure of present units, age of household head and presence of persons over 65, tenure and number of bedrooms and plumbing facilities, tenure and persons per room, and value and gross rent of present unit. These statistics are also broken down according to race. Area classifications, and definitions and explanations of subject characteristics are appended, along with source and reliability of estimates and a facsimile of the Annual Housing Survey Questionnaire for 1975. Table - finding guides are also provided.

PB80-136732 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas: Cincinnati, Ohio-Kentucky-Indiana. Standard Metropolitan Statistical Area. Annual Housing Survey: 1975.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Aug 77, 115p HUD-0000720
Paper copy available from the Sup. of Docs., Stock number 003-024-01383-5.

Housing and household characteristic statistics are presented from the 1975 - 1976 Annual Housing Survey conducted in Cincinnati, Ohio - Ky. - Ind., one of 21 selected standard metropolitan statistical areas (SMSAs). These statistics are based on information collected by personal interviews from a sample of housing units. Tables contain the following information: general and financial characteristics of the housing inventory in 1970 and 1975; selected housing characteristics of new construction units for 1975; 1970 characteristics of housing units removed from the inventory in 1975; characteristics of owner - occupied and renter - occupied housing units; and financial characteristics of housing units (1970 and 1975) for black and Hispanic heads - of - household. Other topics covered which refer to owner - occupied and renter - occupied housing units incorporating 1975 data include: occupancy and utilization characteristics and services available; selected structural characteristics by deficiencies; failures in plumbing facilities and equipment; and selected neighborhood characteristics for all races as well as for black and Hispanic heads - of - household. In addition, tables provide information on income of families and primary individuals in both owner - occupied and renter - occupied housing units, the value of owner - occupied housing units, and the gross rent of renter - occupied housing units. These data are broken down additionally by black and Hispanic heads - of - household. The final tables contain selected characteristics of all occupied housing units and of units occupied by recent movers by tenure. In addition, data are compared with previous years involving tenure and location of present units, tenure and units in structure of present units, age of household head and presence of persons over 65, tenure and number of bedrooms and plumbing facilities, tenure and persons per room, and value and gross rent of present unit. These statistics are also broken down according to race. Area classifications, and definitions and explanations of subject characteristics are appended, along with source and reliability of estimates and a facsimile of the Annual Housing Survey Questionnaire for 1975. Table - finding guides are also provided.

PB80-136740 MF **A01**
Bureau of the Census, Washington, DC. Housing Div.
Housing Characteristics for Selected Metropolitan Areas: Colorado Springs, Colorado. Standard Metropolitan Statistical Area. Annual Housing Survey: 1975.
Elmo E. Beach, Aneda E. France, Edward D. Montfort, and George Spraggins. Aug 77, 141p HUD-0000721
Paper copy available from the Sup. of Docs., Stock number 003-024-01384-3.

Housing and household characteristic statistics are presented from the 1975 - 1976 Annual Housing Survey conducted in Colorado Springs, Colo., one of 21 selected standard metropolitan statistical areas (SMSAs). These statistics are based on information collected by personal interviews from a sample of housing units. Tables contain the following information: general and financial characteristics of the housing inventory in 1970 and 1975; selected housing characteristics of new construction units for 1975; 1970 characteristics of housing units removed from the inventory in 1975; characteristics of owner - occupied and renter - occupied housing units; and financial characteristics of housing units (1970 and 1975) for black and Hispanic heads - of - household. Other topics covered which refer to owner - occupied and renter - occupied housing units incorporating 1975 data include: occupancy and utilization characteristics and services available; selected structural characteristics by deficiencies; failures in plumbing facilities and equipment; and selected neighborhood characteristics for all races as well as for black and Hispanic heads - of - household. In addition, tables provide information on income of families and primary individuals in both owner - occupied and renter - occupied housing units, the value of owner - occupied housing units, and the gross rent of renter - occupied housing units. These data are broken down additionally by black and Hispanic heads - of - household. The final tables contain selected characteristics of all occupied housing units and of units occupied by recent movers by tenure. In addition, data are compared with previous years involving tenure and location of present units, tenure and units in structure of present units, age of household head and presence of persons over 65, tenure and number of bedrooms and plumbing facilities, tenure and persons per room, and value and gross rent of present unit. These statistics are also broken down according to race. Area classifications, and definitions and explanations of subject characteristics are appended, along with source and reliability of estimates and a facsimile of the Annual Housing Survey Questionnaire for 1975. Table - finding guides are also provided.

PB80-136757 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Audit of the HAO (Housing Allowance Office) Analysis Files, Site I, Year 3. Housing Assistance Supply Experiment.
Ann W. Wang. May 79, 38p HUD-0000764
Contract HUD-H-1789

Findings of an audit of administrative data collected by the Housing Allowance Office (HAO) in Brown County, Wis., during the first three years of the program (June 1974 - June 1977) are presented. Both the quality and accuracy of the program data are assessed for the benefit of future users and for the purpose of providing guidance for modifying administrative and data preparation procedures at the HAO. First, preliminary cleaning checks were conducted from the five raw data files sent by HAO, and variables important for analysis were selected and subjected to three types of computerized checks to detect errors in value ranges, internal consistency, and cross - record consistency. Investigation revealed very few genuine errors (less than 0.5 percent). Second, the five data files were combined to create three analysis files including the client characteristics file, the housing characteristics file, and the recertification file. Matching raw data from these three files provided another opportunity to detect errors; errors

due to mismatching in the housing characteristics file affected fewer than three percent of the records, and either negligible or no mismatches were found in the remaining two files. In addition, a set of 26 derived variables was produced, and consistency checks revealed some correctable anomalies in the files, but no other problems. Finally, marginals (response frequencies) were manually examined for each variable to see that the responses fell within specified limits. Review of the marginals confirmed the thoroughness of the audit and the effectiveness of the preliminary checks in detecting nearly all errors. It was concluded that although the overall incidence of errors in the HAO data was extremely low, it would have been lower had HAO been more careful and systematic in some of its recordkeeping procedures. Footnotes and appendices are provided.

PB80-136765 PC **A13**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the HAO (Housing Allowance Office) Client Characteristics File: Site I, Year 3. Housing Assistance Supply Experiment.
Ann W. Wang, and Leslie Geller. May 79, 288p HUD-0000765
Contract HUD-H-1789

This codebook is one of a series constituting an archive of the Housing Allowance Office (HAO) materials used to analyze the effects on clients and communities of the experimental allowance programs. The codebook contains data on all 12,020 households that applied for assistance during the first three years (1974 - 1977) of the program in Brown County, Wis. Most of the data relate to the 6,483 clients who actually enrolled in the program. Compiled from administrative records maintained by HAO, the codebook describes each data element in the file, identifying the administrative record source, reproducing relevant portions of administrative forms, specifying all permissible entries, and annotating each element with a definition. Marginals, or tabulations of all responses for each data element, are included. The HAO, whose purpose is to enroll eligible applicants, evaluate their housing, and disburse program payments, maintains six machine - readable files whose records are transcribed from a variety of administrative forms that are completed in the course of dealing with applicants and enrollees. Data in this codebook are arranged according to the source files that make up the client characteristics file. Statistical data are presented under the subject headings of client identification, eligibility and participation, household characteristics, and housing characteristics and expenses. Tabular data and appendices are included.

PB80-136773 PC **A08**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the HAO (Housing Allowance Office) Housing Characteristics File: Site I, Year 3. Housing Assistance Supply Experiment.
Ann W. Wang, and Leslie Geller. May 79, 153p HUD-0000766
Contract HUD-H-2200

Used to analyze the effects of HUD's Experimental Housing Allowance Programs on the communities they serve, this codebook was prepared for the Housing Allowance Office's (HAO's) housing characteristics file. Compiled from administrative records maintained by the HAO in enrolling eligible applicants, evaluating their current or prospective housing, and disbursing program payments, the file contains data on all 6,483 households that enrolled in the first three years of the program between June 18, 1974 and June 24, 1977 in Site I (Brown County, Wis.). The codebook describes each variable in the file, identifying the adminstrative record from which it was taken, reproducing the relevant part of the administrative forms, specifying all permissible entries, and annotating each element with a complete definition. The codebook also contains marginals for each data element -- a tabulation of all responses in the housing characteristics file. Companion codebooks for the Site I HAO's client characteristics and recertification characteristics files will cover the same period. The appendices contain a housing unit evaluation form and housing unit certification form, a glossary, maps of Site I neighborhoods and census tracts, tables of standard housing expenses, and an alphabetical index of variables.

PB80-136781 PC **A03**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Mobile Homes.
Evaluation rept.
Nov 74, 28p HUD-0000768

Reporting on an exploratory study of HUD's participation in the mobile housing field in Region IX, this study was undertaken to determine if HUD has any processing or management problems with the 207 - m (mobile home park) program. It also was designed to determine whether a full evaluation of the 207 - m and Title I, Sec. 2 is needed, and if so, what region - wide data system should be used. Since HUD has had two mobile home programs operational since 1969, and since mobile homes appear to be a potential major source of low - cost housing, researchers hoped that this study would produce significant indications for future planning. Information was gathered on HUD insured mobile home projects in California and Arizona, using the On - Line Management Information System as well as file reviews in the San Francisco, Los Angeles, Santa Ana, Phoenix, and Sacramento Field Offices. Field trips and interviews were also conducted. Findings show that HUD Region IX has processed few 207 - m mobile home parks due to serious program restrictions, developer and local authority preferences, and overall market and finance limitations. HUD field offices do not have comprehensive data and monitoring systems to aid in processing and managing the 207 - m program, but that audit activity which has been conducted is encouraging. Furthermore, HUD individual mobile home insurance has had a low claim rate on low volume in Region IX, and does not seem to fill any void in financing. Status and causal factors of defaults in HUD - insured mobile home parks show that HUD Region IX has a default rate of 16 percent, less than the national default rate. Other findings show that mobile homes are not usually a low - cost housing alternative, that parks and individual units tend to age together, and that individual mobile home coaches tend to be more stationary in California than in Arizona due primarily to climatic and coach - size factors. It is concluded that a full scale evaluation is not needed at this time. The following actions are recommended: (1) the HUD office should work closely with all HUD insured mobile home parks; (2) the HUD regional and Field Office Housing Production and Mortgage Credit (HPMC) staff should develop a means to become alerted to upswings in the level of 207 - m activity; and (3) HPMC should consider altering rent - up period calculations to reflect actual market conditions and apply adequate operating deficit requirements where needed and appropriate. Appendices are included.

PB80-136799 PC **A02**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
'As Is' Property Disposition Sales Program.
Evaluation rept.
Oct 74, 21p HUD-0000769

This evaluation was undertaken to determine if the 'As Is,' All Cash, Without Warranty Sales Program was being utilized in Region IX to meet HUD's goal of reducing the inventory of acquired properties; the program was designed to ensure the maximum return to the mortgage insurance funds while complementing the national goal of developing decent, safe, and sanitary housing. Three analyses were conducted: the impact of the individual 'As Is' Program on localities, consumers, and HUD. A total of 407 files were reviewed in four Region IX (Calif.) offices: the San Francisco and the Los Angeles Area offices and the Sacramento and Santa Ana Insuring Offices. Interior inspections and interviews with occupants of properties sold under the 'As Is' Program in localities under the jurisdiction of three of the four HUD offices were conducted. An additional 81 exterior inspections of properties were made, and interviews with the local officials responsible for Code Enforcement in 11 localities within the jurisdictions of the four HUD field offices were conducted. The 'As Is' Program appeared to be capable of meeting the Department's objective of reducing the inventory of HUD - acquired properties while returning housing to communities which may be made free of major health and safety deficiencies. However, the evaluation also revealed a number of exceptions to this general rule. In fact, the absence of serious health and safety conditions in properties appears to be more the result of fortuitous conditions than of program design. To minimize the number of 'As Is' properties which are not subsequently made free of major health and safety deficiencies, the evaluators have developed a series of recommendations designed to strengthen HUD and local management of the program, including amendments to the 'As Is' contract, having purchasers acknowledge all contract amendments or addenda, and instructing field office Property Disposition staffs to report all 'As Is' sales to the In the julding or housing department. A list of further recommendations and supportive tabular information are supplied.

PB80-136807 PC **A04**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
FHA Single-family Workload Forecasting. Preliminary Notes.
Memorandum.
02 Jun 75, 52p HUD-0000771

The results are provided of a 1 - month effort in May 1975 to develop and implement a statistical model of the HUD / FHA housing market to predict the single family workload for Region IX. The results were based on a study of past relationships between the number of FHA insurance applicaions received and a selected set of market indicators and policy variables. A causal model consisted of the following seven variables which were found to be both theoretically and statistically important in predicting levels of proposed and existing housing activity: (1) FHA interest rate ceilings; (2) Consumer Price Index (all items); (3) Consumer Price Index (homeownership); (4) net new savings in thrift institutions; (5) yield on 3 - month Treasury bills; (6) Federal Home Loan bank advances; and (7) Federal Home Loan Bank repayments. The model was developed using aggregate data for Region IX and was then applied to observations from the eight field offices. Assumptions were made as to the future value of some of the indicators, and the estimated equation was used to project number of applictions from March 1975 to March 1976. Separate projections were made for existing and new home mortgage insurance applications for the region and for the field offices. For the region as a whole, the model projected an overall increase in workload of about 49 percent during the first half of fiscal year 1976 over 1975. For each field office, the overall increase came to 58 percent in applications received during the same period. Since the estimates of the regions as a whole are more reliable than for individual offices, it is recommended that the regional total be used as the overall workload estimate, and that this workload be allocated proportionately among the offices according to the individual office statistical estimates. Appendices discuss the methods, forecasts, and qualifications of the results; they describe the data base and list scattergrams of the forecast runs for the individual offices.

PB80-136815 PC **A03**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Evalution Research Summaries. HUD Region IX.
Feb 79, 48p HUD-0000778

Summaries are provided of major research projects undertaken for and by Program Planning and Evaluation (PP&E) in HUD Region IX from 1973 through the early part of 1979. Not all of the studies done by PP&E are represented, but an effort was made to reflect those which represented a major expenditure of HUD resources, or which contain information that is still of interest. Each summary consists of a brief description of subject material, methodology, and findings. Subject areas, under which programs were conducted, include block grant programs, planning and environmental issues, Indian programs, fair housing and equal opportunity programs, single - family development issues, single - family management issues, and multifamily management issues, and assisted housing programs. Some of the specific programs summarized in this document include a guide to local housing rehabilitation strategies, local gov-

ernment experience with housing assistance plans, California's State planning system, an Indian housing study, minority contractor involvement with repair contracts, enforcing the Title VIII Fair Housing Law, a HUD performance survey, a handbook for fee personnel, single family fee appraisers, fee mortgage credit examiners, controlling costs of repairing acquired properties, single - family default and foreclosures, multifamily failures, production costs of subsidized housing, and beneficiaries of subsidized housing.

PB80-136823 PC **A06**/MF **A01**
Brill (William) Associates, Inc., Annapolis, MD.
Comprehensive Security Planning: A Program for William Nickerson Jr. Gardens, Los Angeles, California.
Final rept.
Dec 77, 108p HUD-0000779
Contract HUD-H-2249

Focusing on a large public housing project of 1,110 units in south central Los Angeles, Calif., this report outlines the security planning and analysis techniques developed to prepare a security plan for the project. The social and physical environments of the project were analyzed to determine factors that contribute to the vulnerability of residents either by affecting victimization or their fear of crime, or that cause them to restrict the use of their environment because of their concern about crime. The percentage of crime victims among predominantly black tenants of the project was higher in most categories than the national average. The rate of fear was high, with more than 50 percent of those interviewed anticipating violence in the year ahead as well as responding to their fears by curtailing nightly visits to friends or halting evening shopping trips. Security measures for this troubled project will affect site improvements, management changes, organization of residents, and improvements in the delivery of social and police services. One of the major recommendations for the project suggests that the project be broken up into clusters or mini - neighborhoods to encourage the formation of close, supporting relationships that are necessary for a community to resist crime and to control its own membership. It is recommended that these clusters be reinforced architecturally with fences, hedges, and entranceways, and reinforced socially by organizing residents in each of the clusters. A variety of other improvements and recommendations are included in this report. Tables, graphs, and site plans accompany the text.

PB80-136831 PC **A06**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Displacement Report. Report on Housing Displacement.
Interim rept.
Feb 79, 108p HUD-0000808, HUD/PDR-382

This report investigates the nature and extent of displacement, focusing on displacement as a result of neighborhood revitalization and Federal programs. Although it is important to analyze the reasons for household moves, the consequence of demographic factors, and the low supply of available housing, data are incomplete and often unreliable. The information that does exist points out several displacement phenomena. First, less than four percent of all household moves were displacement moves. Second, displacement as a direct result of government programs represents less than one - fifth of all displacement reported in the Annual Housing Survey. Third, housing abandonment and disinvestment account for a significantly greater proportion of displacement than that occasioned by neighborhood reinvestment. Fourth, population and economic trends represented by revitalization in urban areas are far too small to slow down or to reverse the movement to the suburbs and the loss of economic activity by central cities. Studies of revitalizing areas, though failing to provide national estimates of revitalization or displacement, afford some insight into characteristics of "in - movers" (who tend to be young white professionals, single or with small families, and with sufficient income to overcome neighborhood deficiencies in schools and services) and "out - movers" (who tend to be elderly or minority owners and renters). Displacement caused by Federal actions covered by the Uniform Relocation Act appears to be small relative to displacement occurring for other reasons, and HUD has developed policies and administrative procedures to ensure that some form of assistance is provided to persons displaced as a result of HUD programs. These policies are discussed as well as the issue of "secondary" displacement associated with Federal or Federally - assisted programs or activities. Appendices, footnotes, and a bibliography are included.

PB80-136880 MF **A01**
Department of Housing and Urban Development, Washington, DC.
HUD Condominium/Cooperative Study. Volume 1: National Evaluation.
William Lilley. Jul 75, 357p HUD-0000816
Paper copy available from the Sup. of Docs., Stock number 023-000-00303-1.

Since 1970, condominiums and cooperatives have become an increasingly significant factor in the U.S. housing market. As of April 1, 1975, there were 1.69 million condominium and cooperative housing units, about 75 percent used the condominium form of ownership, and more than 75 percent were located in the West and the South. The phenomenon is a recent one; more than 85 percent of the units were built since 1970. Conversely, the popularity of cooperative ownership has declined. Condominiums generally offer greater access to shopping and other facilities, reduced maintenance by the owner, and shared amenities. However, compared to single - family homes in the same price range, they generally have less square footage, greater density, and the responsibilities of joint ownership. Primary purchasers are childless couples aged 25 - 34 and couples aged 45 - 64 whose children are no longer living at home. These persons might otherwise be renters but wish to enjoy the tax benefits and amenities offered by condominiums. Rent controls and other factors which make apartment ownership uneconomical have hastened the condominium conversion boom. Those most affected by conversions are low - income renters, new households, older persons who do not wish equity accumulation, and households preferring rental units. Major problems identified include long - term recreational leases (especially in Florida), poor construction, complex legal documents, displacement of tenants due to conversions, misuse of funds, and community living problems. Charts, tables, and graphs illustrate the discussion.

PB80-136898 MF **A01**
Urban Inst., Washington, DC.
Lower Income Housing Assistance Program (Section 8). Nationwide Evaluation of the Existing Housing Program.
Margaret Drury, Olson Lee, Michael Springer, and Lorene Yap. Nov 78, 101p HUD-0000817, HUD/PDR-359
Paper copy available from the Sup. of Docs., Stock number 023-000-00488-7.

Results of a nationwide evaluation of the Lower Income Housing Assistance Program (Section 8) for existing housing are reported. Data collection and initial analysis were performed by three contractors, with 25 percent of the data collected being responses to a uniform set of questions on key topics. The contractors collected data from a specified number of the Public Housing Agencies (PHAs) and from HUD Area Office records. Interviews were conducted with staff members of Area Offices and PHAs and with 1,600 households and 700 landlords. Data collection and analysis focused on the pattern of participation by households with different income levels and demographic characteristics, the willingness of landlords to rent to subsidized tenants, and a PHA's ability to choose the best ways of performing program administration. The housing participation study determined that recipients are representative of the eligible population, although a disproportionate share of elderly women participated. Half of the recipient households had members who were elderly, handicapped, or disabled, and over three - fourths of the households were headed by women. Participating landlords reported making improvements on their units to qualify for the subsidy. All of those involved at the local level expressed a high degree of satisfaction with the program administration. The report also examines the expenditure of $1.35 billion in HUD annual assistance payments under the Existing Housing Program. Tables and figures provide information on the demographic characteristics of participants and the average gross rents paid. Bibliographic references are provided.

PB80-136906 PC **A09**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Home Improvement Financing.
Harry G. Foden, Robert Dubinsky, and Dorothea Hass. Sep 77, 186p HUD-0000818, HUD/PDR-408
Contract HUD-H-2511

This report on home improvement financing brings together a wide range of information on how homeowners acquire funds to repair and renovate their homes. A major topic addressed is how HUD's Title I Property Improvement Loan Program fits into the overall home improvement financing complex. The report information was gathered in a field study of five localities, including Kansas City, Kans. / Mo., Reading, Pa., Minneapolis / St. Paul, Minn., Louisville, Ky., and Newburgh, N.Y., during which informal discussions were held with lenders, contractors, building material suppliers, and public officials. A series of 18 panel discussions in eight metropolitan areas also were held, additional data were collected from a number of public and private sources concerning types and reasons for home improvements, difficulties encountered in obtaining financing, attitudes of lending institutions toward home improvement loans, the role of insurance in lending, and Title I experiences. Data analysis indicated that homeowners are stimulated to make improvements out of pride of ownership and perception of neighborhood quality. Homeowners are likely to make small improvements themselves, but will hire a professional and finance the activity with installment loans, revolving charge accounts and credit cards, 30 - to - 45 - day billing, and secured loans if the job is major. The Title I Property Improvement Loan Program is playing a decreasing role in insuring home improvement loans, as a result of long - term financial and market trends. Programs which use Title I as part of an assistance program for low - income homeowners can be classified as home improvement loans using State - issued bonds, interest subsidy programs, grant programs, and technical assistance and referral services. Recommendations are made including the suggestion that an informational program to acquaint lenders with the elements and benefits of the Title I program be established. Study data and a bibliography are provided.

PB80-136914 MF **A01**
Department of Housing and Urban Development, Washington, DC. Library Div.
Built Environment for the Elderly and the Handicapped. Edition Number Two.
Selective bibliography.
Feb 79, 66p HUD-0000826
Paper copy available from the Sup. of Docs., Stock number 023-000-00529-8.

Studies and articles on the elderly and the handicapped are provided in this selected bibliography of publications and periodicals issued since 1970. Source materials in this bibliography, which address the problems of the elderly, concern the aging process, retirement and income, the housing situation, housing design, congregate housing, long - term care, safety, services for the elderly, and foreign experience. Articles involving the needs of the handicapped address their housing problems, design access, foreign experience, and services for the handicapped. Supplementing these entries, bibliographies grouped at the end of each section supply additional references, and addenda include those items received by the HUD library too late to be included in the main body. Of particular importance is the series of hearings published in 1978 by the House of Representatives' Select Committee on Aging. Most of the items listed are available in the HUD library. Numbers in brackets following book citations are the library's call numbers. However, HUD distributes only its own publications; all others listed will be found in local libraries or should be ordered from the publishers. Finally, a list of periodical and newsletter information sources is provided, and an author index is appended.

PB80-136930 MF **A01**
Department of Housing and Urban Development, Washington, DC.

HUD Condominium/Cooperative Study. Volume 3: Appendices D-H.
William Lilley. Jul 75, 92p HUD-0000856
Paper copy available from the Sup. of Docs., Stock number 023-000-00305-8.

Because data are lacking on the characteristics of owners and developers of condominiums and cooperatives, a mail survey was sent to 5,200 condominium associations across the country. The 1,019 completed returns were then checked for biases by comparing them with a random sample of 25 associations which did not respond but were contacted by telephone. The survey results are appended. Tables show that the most common type of development is the attached townhouse, followed by garden - type low - rises and regular low - rises. Nearly three - fourths of the units are condominiums; only 2 to 3 percent are cooperatives. The majority of respondents were satisfied with the management and the common facilities. These data were analyzed using a number of statistical techniques; the breakdowns are also presented in tabular form. A telephone survey was conducted to gather basic data on the characteristics of condominium units, projects, owners, and problems in the six market areas studied for this project. The methodology and numerical results are appended. The in - depth discussion is contained in the main body of the report and in appendix A (volume 2). A summary of hearings held in Washington, D.C., on the problems of condominiums and cooperatives, a glossary of terms used, a bibliography containing general works, and a legal bibliography are appended.

PB80-137060 MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Household Mobility in Urban Homesteading Neighborhoods: Implications for Displacement.
Ann B. Schnare. Mar 79, 65p HUD-0000931, HUD/PDR-362/1
Contract HUD-H-2401
Paper copy available from the Sup. of Docs., Stock number 023-000-00416-0.

This report, part of an ongoing evaluation of HUD's Urban Homesteading Program, analyzes mobility in urban homesteading areas between March 1977 and March 1978. Focusing on 40 different neighborhoods in 23 demonstration cities, the report attempts to discover whether households in older neighborhoods are more susceptible to price - induced displacement and whether displacement is actually occurring in urban homesteading neighborhoods. The paper begins with a descriptive analysis of the characteristics of households that stayed, households that moved, and households that replaced the vacating households in urban homesteading neighborhoods. It then presents a series of logistics (LOGIT) analyses that relate the decision to move or stay to the characteristics of the household, the dwelling, and the neighborhood. Two basic LOGIT models are derived: one for owners and one for renters. The sample of renters are stratified by income and age, and separate LOGIT models are estimated for each of the resulting subsamples. This type of analysis, employing the same independent variables that were included in the unstratified equations, enables the study to focus on the most likely victims of displacement -- the elderly and the poor. Findings indicate that although homeowners are unlikely to suffer from displacement, low - income renters do as evidenced by the significant number of these renters who are moving out of the central city as compared to other renters. As with homeowners, renters who move tend to be replaced by families with incomes lower than their own. In addition, elderly and poor homeowners, who are most susceptible to displacement, are the least likely to move. Because of the difficulty of locating households who have moved, further research is needed to determine whether they have been displaced or are moving for other reasons. Methodology and mobility rates in urban homesteading neighborhoods (1977 - 1978) are appended. Supporting tabular data, references, and footnotes are also provided.

PB80-137086 PC **A15**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Div. of Policy Studies.
Problems Affecting Low-Rent Public Housing Projects.
Field study,
Ronald Jones, David Kaminsky, and Michael Roanhouse. Jan 79, 332p HUD-0000949

In support of the Urban Initiatives Program, HUD's Office of Policy Development and Research conducted this policy study in 1978 to probe the extent and nature of problems affecting public housing. Its purpose was to identify the number of projects with critical problems, the kinds of projects that were troubled, and the types of problems these projects face. Data were obtained from a stratified national probability sample of public housing projects; staff analysts interviewed numerous authorities of the public housing program and visited and inspected a subsample of projects. Two approaches were used to define a 'troubled' project: numerical - objective (the extent of trouble depends on the number of severe problems that the project faces) and case - study particular (for each project, the specific kinds and mix of problems determine whether it is troubled). An estimate of the number of troubled public housing projects ranges from 4 to 7 percent of the total inventory depending on which measurement approach or combination of approaches is used. Troubled projects include a disproportionately large share of all family projects located in urban areas (43 percent of all projects, 75 percent of troubled projects); they have more than 200 units (14 percent of all projects, 43 percent of troubled projects); or they were initially occupied more than 20 years ago (33 percent of all projects, 43 percent of troubled projects). In addition, public housing projects face financial, physical, managerial, and social problems. The views of interviewed authorities representing Public Housing Authority (PHA) executives, managers, and tenants, as well as legal services attorneys, public officials, housing professionals, academic experts, and HUD managers are presented. Solutions are explored, although some of the problems appear to be beyond the direct control of either HUD or individual PHA's. Appendices contain a description of sampling procedures, a list of PHA's and projects visited, public housing survey instruments, extensive tabular data, and related information. Charts and illustrations are included.

PB80-137094 MF **A01**
Brill (William) Associates, Inc., Annapolis, MD.
Site Elements Manual. Planning for Housing Security.
Jun 79, 78p HUD-0000951, HUD/PDR-460
Contract HUD-H-2249
Paper copy available from the Sup. of Docs., Stock number 023-000-00534-4.

Guidance is given for using effectively such housing project site elements as shrubs, trees, bushes, ground covers, walls, fences, slopes and beams, and manufactured items to provide a secure environment for residents. The site security analysis, for which this manual is a reference volume, analyzes the site to determine the extent to which it possesses characteristics generally associated with crime and the fear of crime. The analysis also examines the site to determine if it inhibits the development of supportive relationships among residents. To measure these factors, the site is examined according to the following criteria: (1) unassigned open spaces, which individuals or groups of residents have not claimed for their own use so that the spaces become vulnerable to misuse; (2) penetrability, which refers to how access to the site is structured and controlled; (3) ease of surveillance, which provides numerous opportunities for casual and formal surveillance of activities and space; (4) design conflicts, which occur when two incompatible areas of activity are located next to one another; and (5) encouragement of territoriality, which stimulates residents to take control of their immediate environment. Housing sites in more than 10 cities throughout the United States are analyzed according to these criteria. Appendices examine design considerations and plant hardiness zones. Suggested references and a bibliography are provided.

PB80-137102 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Div. of Evaluation.
Discrimination Against Chicanos in the Dallas Rental Housing Market: An Experimental Extension of the Housing Market Practices Survey.
Jon Hakken. Aug 79, 40p HUD-0000956

Adapting an "audit" technique used to measure discrimination against blacks in the nationwide housing market, this study determines the extent of housing discrimination against Chicanos in the Dallas, Tex., rental housing market. It focuses on three issues: (1) types of discriminatory treatment Chicanos are likely to encounter in the rental housing market; (2) the extent to which Chicanos encounter various types of discriminatory treatment, depending on their skin color; and (3) the extent of discriminatory treatment against Chicanos as compared to that against blacks in the same market. Types of discriminatory treatment measured included providing false or incomplete information about housing availability, offering less favorable terms and lease conditions, withholding lease information, ignoring common courtesies that might facilitate the rental process, and screening apartment seekers' qualifications in different ways. Clear evidence of discrimination was uncovered, particularly against dark - skinned Chicanos, who have a 96 percent chance of experiencing at least one instance of discrimination in the typical housing search involving six rental agencies. Light - skinned Chicanos have about a 65 percent chance. Although the results cannot be generalized as an example of national policy, the study does illuminate the usefulness of the audit methodology for measuring discrimination. Detailed results and study data are included.

PB80-137144 MF **A01**
American Institutes for Research, Washington, DC.
Crime in Public Housing. A Review of Major Issues and Selected Crime Reduction Strategies. Volume II: A Review of Two Conferences and an Annotated Bibliography.
W. Victor Rouse, and Herb Rubenstein. Dec 78, 104p HUD-0000998, HUD/PDR-468/2
Contract HUD-H-2855
Paper copy available from the Sup. of Docs., Stock number 023-000-00537-9.

This second volume of a two - volume report on "Crime in Public Housing: A Review of Major Issues and Selected Crime Reduction Strategies" includes a summary of the National Association of Housing and Redevelopment Officials (NAHRO) / HUD Anti - Crime Conference held on September 12 - 13, 1978; a summary of the American Institutes for Research (AIR) / HUD Conference on reducing crime in and around public housing held on October 2 - 3, 1978; and an annotated bibliography of the literature on crime and crime reduction. The NAHRO / HUD conference elicited the opinions of those most directly concerned with crime in public housing developments: public housing residents, managers, social workers, and security officers. There was a consensus that HUD must provide adequate and sustained funding for security programs to replace funding for 1 - year and 2 - year demonstration grants. The AIR / HUD conference engaged experts on crime prevention in extensive debates about what strategies are effective in what circumstances. Participants agreed that one of the key ingredients of an effective anticrime program is a well - planned process designed to (1) gain an understanding of crime problems for each public housing authority and residential complex; (2) gain awareness of the available local resources that may help reduce crime; and (3) bring together all of the groups familiar with the problems to share ideas and devise strategies about how to reduce crime in the housing complex. The extensive annotated bibliography (more than 500 citations) focuses on crime and crime reduction in public housing areas.

PB80-137169 PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Welfare Reform and Housing Assistance.
Rodney T. Smith. Sep 79, 118p HUD-0001037
Grant HUD-H-2849RG

For groups involved in welfare reform of housing programs from a budgetary or recipient perspective, this report assesses the economic impact of selected welfare reform options on families receiving HUD housing assistance. To successfully analyze welfare reform, the report examines operation of existing welfare programs and discusses existing benefit schedules, with special emphasis on the interactions among the benefits of different programs (i.e., Aid to Families with Dependent

Children, housing assistance programs, Food Stamps, and Medicaid). Two types of assistance are distinguished: cash assistance, the transfer of dollars that recipient households can spend as they wish; and in - kind assistance, the allowance by dispersing authority for recipient households to purchase specified goods at below - market prices. Existing analyses of recipient benefits from assistance programs that estimate the amount of cash recipients must receive to leave the in - kind program voluntarily are surveyed. A general theory of how multiple in - kind assistance programs affect household consumption patterns and real income also is presented. It addresses the transfer of goods at below - market prices, with and without quantity restrictions. The methodology for estimating transfer relies on information from consumer demand, program benefit schedules, and the actual amount of in - kind assistance received by households. This methodology is applied to an evaluation of in - kind assistance received by samples of low - income households in New York City, Michigan, and Brown County, Wis. The consumer - demand equations used in the evaluation are estimated with data from the 1972 - 73 Consumer Expenditure Survey. Policy options for cashing out food stamps and for interfacing housing assistance programs with cash assistance are described, with particular attention to the housing consumption of poor households, their incentives to participate in housing programs, and their real incomes. Appendices contain the labor supply response to in - kind programs, the resale of in - kind benefits, full regression results, and the methodology for estimating discount rates. Footnotes, a bibliography, extensive tabular data, charts, and equations are provided.

PB80-137342 PC **A04**/MF **A01**
Midwest Research Inst., Minnetonka, MN. North Star Div.
Developing a Plan for the Stable Operation of the United States Hockey Hall of Fame.
Final rept.
25 Jun 79, 53p EDA-80-013
Contract EDA-06-06-01532-40
Prepared for Minnesota Dept. of Economic Development, St. Paul.

The purpose of the project was to develop optional plans for bringing about the stable operation of the U.S. Hockey Hall of Fame. The study found the following: Move the U.S. Hockey Hall of Fame to the Twin Cities to achieve a better traffic position. A dynamic approach applying modern amusement technology should be used to broaden the appeal. A more balanced focus between the Hall elements--basics of hockey, the role which significant American figures have played in the evolution of the sport, and the stories of the players themselves--should be achieved.

PB80-140361 PC **A06**/MF **A01**
Illinois Univ. at Chicago Circle. Dept. of Criminal Justice.
Urban Mass Transit: Crime and Related Problems - A Brief Historical Review, 1850-1977, with Annotated Bibliography.
Research rept.,
Paul S. Wallace. Aug 77, 101p UMTA-UTD-50-79-1

The paper reviews criminal activity involving public transit systems from 1850-1977. It shows that the type of crime evolved from primarily non-violent, e.g., pickpocketing, prior to 1930 to violent, e.g., assaults-robbery after 1930. Attempts by transit systems to cope with the problem through legislation, police, public relations, and modern technology is described herein. The bibliography presents in one document references to data associated with urban transit security. Bibliographical entries, in this report, are annotated, and indexed by author, periodical, subject, title, and foreign references. It is organized into eight parts: (1) Theses and Books; (2) Government Reports; (3) Private Reports; (4) Periodical Articles; (5) Newspaper Articles; (6) Unpublished Papers, Reports, and Speeches; (7) Legislative and Legal Documents; and (8) Suggested Readings. Instructions for obtaining cited items is included.

PB80-141765 PC **A24**/MF **A01**
Maryland Governor's Commission on Law Enforcement and the Administration of Justice.
Comprehensive Plan 1980. Volume II.
Sep 79, 557p
Grant LEAA-80-FG-AX-0024
See also Volume 1, PB80-141773.

The Plan is intended to form the basis for improvements in both the adult and juvenile justice system. It has been designed to place emphasis on reducing crime and improving the operations of the system. Included in Volume II are the following sections: major problems confronting Maryland's criminal justice system; the Commission's long range plans for the improvement of the criminal and juvenile justice system and the reduction of crime throughout the State; the Commission's five year objectives, one year funding objectives, and applicable standards and goals; and the annual action grants program for 1980.

PB80-141773 PC **A25**/MF **A01**
Maryland Governor's Commission on Law Enforcement and the Administration of Justice.
Comprehensive Plan 1980. Volume I.
Sep 79, 600p
Grant LEAA-80-FG-AX-0024
See also Volume 2, PB80-141765.

The Plan is intended to form the basis for improvements in both the adult and juvenile justice system. It has been designed to place emphasis on reducing crime and improving the operations of the system. Included in Volume I are the following sections: an introduction, the method used for collecting and analyzing data, the nature of crime and delinquency in Maryland, and major problems confronting Maryland's criminal justice system.

PB80-142110 PC **A22**/MF **A01**
Arkansas Rehabilitation Research and Training Center, Hot Springs.
Research Directory of the Rehabilitation Research and Training Centers, Fiscal Year 1979.
Dec 79, 523p ARRTC/HEW-79/01, ISBN-0-931026-04-0
Grant RSA-16-56812
Also pub. as ISSN-0096-1531. See also report dated 1978, PB-297 303.

The ninth edition of the Directory has been prepared for local, national, and international rehabilitation service agencies, institutions, and consumer groups. Focusing on priority areas of severely handicapped and independent living rehabilitation, these vital programs of the recently organized National Institute of Handicapped Research discover new ways to improve rehabilitation methodology and service delivery systems, reduce or stabilize handicapping conditions, and maximize social and economic independence; and secondly, promote the use of new knowledge through training programs. Other responsibilities of the RT Center network include increasing rehabilitation personnel in fields where acute manpower shortages exist, training rehabilitation research and service personnel, incorporating rehabilitation education into university undergraduate and graduate curricula, and improving skills of rehabilitation professionals, aides, volunteers, consumers, and others involved in the rehabilitation process.

PB80-144116 PC **A15**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC. Ethics Advisory Board.
Meeting of the Ethics Advisory Board, February 1-2, 1980, Washington, DC.
Feb 80, 342p

The transcript contains proceedings of the meeting on CDCs request for exemption from the Freedom of Information Act.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A079 610/2 PC **A02**/MF **A01**
Letterman Army Inst of Research San Francisco CA
Microdetermination of Sucrose in Plasma with the Anthrone Reagent.
Interim rept. Jan 75-Sep 78,
John P. Hannon. Nov 79, 24p Rept no. LAIR-80

Quantitative determinations of sucrose in plasma required preliminary protein precipitation with Ba(OH)2 - ZnSO4 or ethyl alcohol followed by centrifugation. Aliquots of the resultant protein-free supernate were then concentrated to dryness at 80 C with a manifold evaporator after which endogenous monosaccharides were destroyed by the addition of 0.1 ml of 30% KOH and heating for 10 min at 100 C. Upon cooling, optimum sucrose-anthrone color development was achieved by the addition of 3.0 ml of anthrone reagent (0.15% anthrone in 75% H2SO4 - 25% H2O mixture), followed by heating at 40 C for 30 minutes, cooling, and the recording of optical density at 625 nm. The reaction followed Beer's Law over the range of 10 to 80 micrograms of sucrose. The effectiveness of the procedure in estimating anatomic and physiologic parameters of extracellular space was explored. (Author)

AD-A080 079/7 PC **A02**/MF **A01**
New York State Coll of Agriculture and Life Sciences Ithaca Dept of Plant Pathology
Enzymology of Plant Cell Wall Breakdown by Plant Pathogens.
Rept. no. 4 (Final) 26 Sep 77-25 Sep 79,
Durward F. Bateman, and James R. Aist. Nov 79, 12p ARO-14317.1-L
Grant DAAG29-77-G-0219

The enzymatic degradation and structure of higher plant primary cell walls were the subjects of study. The enzymes employed included endopectate lyase, endo-beta-1,4 galactanase, endo-beta-1,4 xylanase and alpha-L-arabinofuranosidase. Cell wall material was from suspension cell cultures of Phaseolus vulgaris L. (bean) and Oryza sativa L. (rice). Extensive investigation of cell walls isolated from suspension cell cultures revealed that walls from both the dicot and monocot sources were quite heterogeneous with respect to cell wall types, and thus unacceptable for the proposed studies. Bean (dicot) cell walls proved to be much more susceptible to degradation by endopectate lyase than rice (monocot) cell walls. Other studies on the enzymolysis of these walls by other enzymes were not undertaken because they were considered to be too heterogeneous for the proposed studies. Preliminary investigation of other sources of primary cell wall revealed that tobacco pith cells represent a good source. Procedures were developed for the purification of an alpha-L-arabinofuranosidase from Sclerotinia sclerotiorum. The endopectate lyase produced by Erwinia chrysanthemi was shown to be inducible and subject to catabolite repression.

PATENT-4 153 808 Not available NTIS
Department of the Navy Washington DC
Novel Prostaglandin Derivatives, Certain in vivo and in vitro Effects Thereof and Processes for the Preparation of Same.
Patent,
B. David Polis, and Edith Polis. Filed 28 Nov 75, patented 8 May 79, 14p AD-D006 857/7, PAT-APPL-635 947
Supersedes PAT-APPL-635 947-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The novel prostaglandis PGBx are useful for a wide variety of in vivo and in vitro biological properties, including the reversal of degenerative changes in mitochondria, the protection of the heart against cardiac insults, the protection and reversal of anoxic damage to the brain, and the improvement of mammalian performance for conditioned psychological tasks. These prostaglandins PGB sub x are prepared, for example, by the base catalyzed reaction of PGB sub 1. (Author)

PB80-127368 PC **A03**/MF **A01**
NEUS,Inc., Santa Monica, CA.
Enzyme Technology Digest - An Information Exchange in Enzyme Technology, Volume 4, Number 1, March 1975,
I. M. Roberts. Mar 75, 38p NSF/RA/T-75/122
Grant NSF-GI-33675
See also Vol. 3, no. 2 dated Nov 74, PB-265 976.

This journal aims to promote the exchange of information among scientists engaged in enzyme utili-

zation research. This issue comprises an editorial; two feature articles ('Affinity Chromatography for Removal of Enzyme Contaminants' and 'Immobilized Lactase: A Review and Engineering Analysis'); informative descriptions of new and continuing grants; domestic and foreign news items; thesis abstracts; a list of new patents by number, title and inventor(s); dissertation titles, institutions, researcher(s) and advisor(s); lists of books and reprints received; a list of enzyme companies; corporate activities; a list of consultants with areas of specialization; and a schedule of forthcoming professional meetings. The Digest is intended to fill the needs of the enzyme technology researcher and user.

PB80-130826 PC **A03**/MF **A01**
Martin Marietta Labs., Baltimore, MD.
Measurement of the Oxygen Cycle: The Mass Spectrometric Analysis of Gases Dissolved in a Liquid Phase,
R. Radmer, and O. Ollinger. 1976, 28p NSF/RA-761811
Grant NSF-AER73-03291

Use of mass spectrometry to measure the oxygen cycle is described. The oxygen cycle is a light-driven reaction that occurs in algae whereby oxygen is directly reduced without intervention of carbon metabolism. Measurement of the oxygen cycle is a special case of the more general analytical problem of measuring the simultaneous evolution and uptake of oxygen. The technique employed requires good time resolution since the oxygen cycle in some cases is a transient phenomenon. A mass spectrometer (MS) was used to determine the identity and isotopic composition of gases admitted via the MS inlet. The MS inlet system utilizes a semipermeable membrane that permits dissolved gases, but not the liquid phase, to enter the instrument. Since the dissolved gases are monitored directly, the time response is much more rapid than that obtained by 'manometric' methods. The MS inlet system is complemented by a specially designed mass selector-data handler system which sequentially tunes the MS to peaks of interest. Simultaneously, the MS output is channeled through preselected attenuators before being fed in parallel to a fast strip-chart recorder and microcomputer. Experimental details of this technique are given and data obtained presented together with a process flow chart.

PB80-132913 PC **A22**/MF **A01**
New Orleans Univ., LA. Dept. of Chemistry.
Proceedings of the Joint US/USSR Conference on the Microbial Enzyme Reactions Project of the US/USSR Joint Working Group on the Production of Substances by Microbiological Means (4th) Held at New Orleans, Louisiana on October 29-November 3, 1978,
George G. Guilbault. 1979, 514p NSF/RA-790177
Contract NSF-INT77-19256

These proceedings summarize the work presented at a joint US/USSR conference at which scientists have collaborated to review progress in the area of microbial enzyme reactions. Included are thirty-one papers of which fifteen are based on studies involving conventional enzymology, nine are concerned with fixed enzymes, five describe biomass conversions, and one paper involves affinity chromatography. Presentations cover new enzyme sources; isolation techniques; purification methods; industrial, medical, and analytical uses of enzymes; and new concepts such as bio-fuel cells. Topics of papers include: scaling and optimization of technological processes by means of immobilized enzymes; serine proteinases of bacteria; cost reduction for producing ethanol from cellulosic biomass; and affinity chromatography by proteinases.

PB80-133226 PC **A09**/MF **A01**
SRI International, Menlo Park, CA.
'In Vitro' Microbiological Mutagenicity and Unscheduled DNA Synthesis Studies of Eighteen Pesticides.
Final rept.,
Vincent F. Simmon. Oct 79, 177p EPA-600/1-79-041
Contract EPA-68-01-2458

Eighteen pesticides being reviewed as a part of the EPA Substitute Chemical Program were tested for mutagenic activity by the following in vitro procedures: (1) Reverse mutation in Salmonella typhimurium strains TA1535, TA1537, TA1538, TA98, and TA100 and in Escherichia coli WP2 uvrA. (2) Induction of mitotic recombination in the yeast Saccharomyces cerevisiae D3. (3) Relative toxicity assays in DNA repair-proficient and -deficient strains of E. coli (strains W3110 and p3478, respectively) and of Bacillus subtilis (strains H17 and M45 respectively). (4) Unscheduled DNA synthesis (UDS) in human fibroblasts (WI-38 cells). Nine of the 18 pesticides were mutagenic in one or more of the assays. One compound, demeton, was mutagenic in all of them. Trichlorofon was mutagenic in all the assays except those for relative toxicity. Acephat was mutagenic in the Salmonella typhimurium in TA100, Saccharomyces cerevisiae D3, and UDS assays. Dicamba, 2,4-D acid, 2,4-DB acid, and propanil were positive only in the assay for relative toxicity. Disulfoton was positive only in the UDS assay, and then only in the absence of the metabolic activation system. Crotoxyphos was positive only in the S. cerevisiae D3 assay.

PB80-134984 Not available NTIS
Skidaway Inst. of Oceanography, Savannah, GA.
Lipids from Nerve Tissues of the Horseshoe Crab, 'Limulus polyphemus',
Richard F. Lee, and Frances Gonsoulin. c1979, 6p NSF/IDOE-79-133
Grant NSF-OCE77-24516
Pub. in Comp. Biochem. Physiol., v64B p375-379 1979.

The predominant lipids of nerve cords, ganglion and brain from horseshoe crabs were cholesterol (11% of lipid) and phospholipid (81% of lipid). Major phospholipids were phosphatidyl ethanolamine and phosphatidyl choline with lesser amounts of phosphatidyl serine and phosphatidyl inositol and sphingomyelin. The phospholipid fraction was characterized by a high content of plasmaloglen, i.e., alk-1-enyl acyl phosphatides, so that 42% of the ethanolamine phosphatides were the plalsmalogen, phosphatidal ethanolamine. Phosphatidyl choline and phosphatidyl ethanolamine were high in polyunsaturation with 20:4 and 20:5 major fatty acids. Sphingomyelin had predominantly long chain saturated fatty acids. Cerebrosides and gangliosides, which are associated with vertebrate nerve tissues, were absent from nerves of horseshoe crabs.

PB80-138944 PC **A02**/MF **A01**
Martin Marietta Labs., Baltimore, MD.
Kinetics of Oxygen Cycle Under Conditions of Limiting CO2 Fixation,
Richard Radmer, Otto Ollinger, and Bessel Kok. 1976, 13p NSF/RA-761788
Grant NSF-AER73-03291

Illuminates Scenedesmus cells reduce O2 at a high rate when the CO2-fixation system is not operative (e.g., in the presence of inhibitors). This study reveals that when the CO2 concentration is depleted in the presence of the inhibitor iodoacetamide, the O2 uptake reaction is half saturated at approximately 8% O2. When the CO2 concentration is depleted to a level of about 30 micromoles, the rate of CO2 uptake declines without a simultaneous increase of the O2 uptake rate. At this concentration another electron acceptor is used, such as bicarbonate, glutamate, or another bound form of CO2. This additional substrate represents a pool equivalent to about one CO2 per chlorophyll. The O2 reduction finally attains its maximum rate when the external CO2 concentration drops below 5 micromoles.

PB80-140650 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Biochemistry.
Biological and Synthetic Systems for Production of Hydrogen from Water.
Annual progress rept. 1 Mar 77-28 Feb 78,
Alvin I. Krasna. 1978, 13p NSF/RA-780692
Grant NSF-AER74-08381
See also report dated Aug 78, PB-293 051.

Two systems were developed for the production of hydrogen and oxygen by the biophotolysis of water. The first system uses intact hydrogenase-containing algae which do not require isolated biological systems or enzymes. The second system consists of isolated spinach chloroplasts coupled via ferredoxin or methyl viologen to hydrogenase or synthetic catalysts. Both systems produce oxygen as a result of the photolysis of water and the oxygen inhibits hydrogen production by inhibiting hydrogenase or oxidizing the coupling electron carriers. The present research seeks to circumvent this problem by developing methods for the continuous removal of oxygen in a reversible manner. A completely synthetic system consisting of EDTA, proflavin, methyl viologen, and platinum or palladium which produced hydrogen in the light was developed. The requirements, nature, and mechanism of this reaction have now been studied in great detail. The aim of these studies is to use a waste product other than EDTA in this reaction or to couple it with a second light or dark reaction which would regenerate the electron donor.

6C. Biology

AD-A079 561/7 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
Observations and Radio Tagging of Balaenoptera Edeni Near Puerto La Cruz, Venezuela.
Technical rept.,
William A. Watkins, Giuseppe N. di Sciara, and Karen E. Moore. Dec 79, 14p Rept no. WHOI-79-89
Contract N00014-79-C-0071

Whales (Balaenoptera edeni) were observed and radio tagged near Puerto La Cruz, Venezuela (23 October to 13 November 1979). The whales appeared to be transient, remaining in the area not more than one day, so that even the two whales tagged with both highly visible streamers and radio beacons could not be located again. A change in the whales' behavior at dusk was indicated by the radio signals, with much shortened submergence times after dark. The modifications to the tag made prior to these experiments appear to have improved several aspects of the WHOI radio whale tag. (Author)

AD-A079 771/2 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Matching-to-Sample Accuracy on Fixed Ratio Schedules.
Medical research progress rept.,
John R. Thomas. 27 Jun 78, 10p Rept no. NMRI-79-71
Pub. in Jnl. of the Experimental Analysis of Behavior, v32 n2 p183-189 Sep 79.

No abstract available.

PAT-APPL-6-080 735 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Control of Winged Waterprimrose and Northern Jointvetch with Fungal Pathogens.
Patent Application,
Roy E. Smith, Jr., Clyde Douglas Boyette, and George Earl Templeton. Filed 1 Oct 79, 13p
PB80-134206
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to a method for biological control of winged waterprimrose with a host-specific strain of the endemic anthracnose fungus colletotrichum gloeosoporioides (Penz). The instant invention is a method for the control of undesirable plants by the use of plant pathogens.

PB80-140445 PC **A07**/MF **A01**
Department of Agriculture, Washington, DC.
Ecology of Tetraonids.
O. I. Smenov, and Tjan Shanskii. 1979, 143p TT-76-59023
Trans. of mono. Ecologiya Teterevinykh Ptitis, Moscow, 1959. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Partial contents:
- The distribution of wild fowl in the territory of Murmansk Province;
- The environment of the wild fowl habitation;
- The wild fowl type of life in different seasons;
- Nutrition;
- Digestion in (tetraonids) wild fowls;
- Growth of nestlings and weight dynamica;
- Moulting and methods of age determination of wild fowl;

Parasites of wild fowl;
Predators of wild fowl;
Reproduction.

PB80-141104 PC **A12**/MF **A01**
National Library of Medicine, Bethesda, MD.
Araneism with Special Reference to Europe,
Zvonimir Maretic, and Drago Lebez. 1979, 252p TT-73-56021
Trans. of unidentified Yugoslavian mono., 1979. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Although the study of spiders, their venoms and their bites is a relatively specialized discipline, it is a difficult field to review, primarily because of the many technical and sometimes obscure journals in which papers on this subject appear, and the diversity of languages employed. The controversial taxonomy and the variations in the composition and potency of spider venoms also add immeasurably to the task of putting together a compendium on araneism. Nevertheless, the present work is an attempt to accomplish this and to encourage further investigative work in this discipline.

PB80-141187 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV. Monitoring Systems Research and Development Div.
Benzene Vapor Depletion in the Presence of Plants.
Final rept.,
Amy J. Cross, James C. McFarlane, and Clyde W. Frank. Sep 79, 23p EPA-600/3-79-096

Three plant species, Eichhornia crassipes in a nutrient hydroponic culture Beta vulgaris saccharifera, and Beta vulgaris cicla in soil and in water cultures, were found to deplete benzene from the air. Following benzene depletion, plant tissues were extracted and no benzene was detected. This suggests that benzene was completely utilized within the test system and that it was degraded to other chemicals.

PB80-143324 PC **A06**/MF **A01**
Tennessee Technological Univ., Cookeville.
Impact of a Commercial Net Fishery on Striped Bass Populations in Two Tennessee Reservoirs.
Master's thesis,
J. Fred Heitman. Jun 79, 103p
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD.

Regulation of commercial fishing in inland waters is a controversial issue faced by fishery agencies and fishermen. Sport fishermen often claim that commercial activities harm sport fishing, while commercial fishermen accuse sport fishermen of influencing legislation that inappropriately restricts commercial activities. The objective of this study was to evaluate the effects of commercial netting on populations of striped bass and other resident game fishes in Watts Bar and Chickamauga Reservoirs, Tennessee.

PB80-147945 PC **A99**/MF **A01**
Massachusetts Cooperative Wildlife Research Unit, Amherst.
Coastal Waterbird Colonies: Maine to Virginia, 1977. An Atlas Showing Colony Locations and Species Composition,
R. Michael Erwin, and Carl E. Korschgen. Nov 79, 691p FWS/OBS-79/08
Contracts DI-14-16-0008-1186, DI-14-16-0008-1189
See also report dated Sep 79, PB80-133069. Prepared in cooperation with Maine Cooperative Wildlife Research Unit, C. ono.

Colonial-nesting seabirds and wading birds are important and conspicuous components of coastal ecosystems. Surveys were conducted during the spring and summer of 1976 and 1977 to locate and describe all nesting colonies of these birds from the Maine-Canada border to the southern boundary of Virginia. In the 10 States included in the surveys, 327,496 pairs of waterbirds of 30 species nested at 844 colony sites. Maine, Virginia and New Jersey harbored the greatest numbers; New Hampshire, Connecticut, and Delaware the fewest. The most abundant seabird species were herring and laughing gulls and common terns. Colony locations are shown on 7.5-min. quad. maps. The estimated number of breeding pairs for each species, the inventory date, and the survey method are listed in a Table immediately preceding each Colony Map. Location, size, habitat, nesting substrate and ownership of each colony site are reported in respective Tables.

PB80-805534 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Whales and Whaling (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Robena J. Brown. Mar 80, 199p
Supersedes NTIS/PS-79/0145, NTIS/PS-78/0114, and NTIS/PS-77/0121.

Research citations include reports on migrations, anatomy, physiology, and marine biological noise. Tracking, tagging, animal behavior, international law, market research, exploitation, and trade are included. (This updated bibliography contains 192 abstracts, 24 of which are new entries to the previous edition.)

PB80-805708 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fisheries Economics: General Economic Studies. Volume 2. 1978-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 80,
Robena J. Brown. Mar 80, 76p
Supersedes NTIS/PS-79/0105, NTIS/PS-78/0101, and NTIS/PS-77/1032. See also Volume 1, 1964-1977, NTIS/PS-79/0104.

The bibliography cites studies on the economics of fishery production. It includes general studies on prices, demand, products, employment, equipment, income potential, and international trade. (This updated bibliography contains 69 abstracts, 25 of which are new entries to the previous edition.)

PB80-805716 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fisheries Economics. Marketing (Citations from the NTIS Data Base).
Rept. for 1964-79,
Robena J. Brown. Mar 80, 255p
Supersedes NTIS/PS-79/0103, NTIS/PS-78/0100, and NTIS/PS-77/1031.

The bibliography cites studies on the economics of fishery production. Part one cites market studies. Marketing studies of fresh, frozen, and canned fish including shell fish are also cited. (This updated bibliography contains 248 abstracts, 23 of which are new entries to the previous edition.)

6E. Clinical Medicine

AD-A079 566/6 PC **A02**/MF **A01**
Office of Naval Research London (England)
The Annual Meeting of the International Skeletal Society (6th),
Irwin M. Freundlich. 15 Oct 79, 9p Rept no. ONRL-C-9-79

Bone radiologists, pathologists and orthopedic surgeons met in Munich, Germany for a meeting and symposium concerned with diseases of bone. New procedures, methods of diagnosis and measurement were described and discussed. (Author)

AD-A079 700/1 PC **A11**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
The Thousand Aviator Study: 1969-1971 Follow-Up Program with Distributions and Intercorrelations of Selected Variables,
Neil R. MacIntyre, Albert Oberman, William Harlan, Robert E. Mitchell, and Ashton Graybiel. 4 Apr 79, 233p Rept no. NAMRL-MONOGRAPH-24

The 1969-1971 evaluation of the U.S. Navy's 'Thousand Aviator' program was the fourth such follow-up examination since the study's inception in 1940. During this evaluation, follow-up status was determined in 995 of the original 1056 subjects (94.2%). In addition, the largest amount of physiologic, psychologic, and other medical data collected to date in the program was obtained on the 675 subjects tested in Pensacola, Florida. As with previous evaluations of the group, a summary of the methodologies employed and an overall view of distributions and interrelationships seemed necessary for a continued understanding of the program and its findings. This report describes in detail the methodology as well as the distributions and intercorrelations of 80 selected variables. Data are presented in the form of descriptive statistics, frequency histograms, and Pearson correlation coefficients. Comments deal exclusively with statistical considerations, and no interpretations are attempted. (Author)

AD-A079 713/4 PC **A03**/MF **A01**
Academy of Health Sciences (Army) Fort Sam Houston TX Health Care Studies Div
Military Occupational Health Surveillance Program.
Final rept. Mar 78-Jun 79,
A. David Mangelsdorff, Thomas H. Lamson, and Donald M. Rosenberg. Jun 79, 35p Rept no. HCSD-79-003

Responses were received from 37 HSC medical treatment facilities (100%) regarding their occupational health surveillance programs. The occupational health programs are directed toward meeting the requirements for job specific medical surveillance of civilian employees. For active duty military personnel determined to be potentially exposed to occupational or job-related hazards, medical surveillance programs are limited, if available at all. An AMEDD health care delivery system which would provide for job specific medical surveillance of military personnel determined to be potentially exposed to occupational or job-related hazards would require more adequate staffing to provide the services. Identification of personnel at risk could be facilitated using guidelines for SSIs and MOSs with potential exposures to hazards. These medical surveillance guidelines are available from USAEHA. Additional requirements are determined by on site inspections and industrial hygiene hazards inventories. (Author)

AD-A079 765/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
American Burkitt's Lymphoma - Hand-Mirror Variant.
Final rept.,
Harold R. Schumacher, Thomas Rainey, Lanning Davidson, David Simon, and Michael Strong. 22 Aug 77, 11p Rept no. NMRI-78-119
Pub. in American Jnl. of Clinical Pathology, v70 n6 p937-944 Dec 78.

No abstract available.

AD-A079 766/2 PC **A02**/MF **A01**
Biomedical Research Inst Rockville MD
The Cultivation of the Exoerthrocytic Stages of Plasmodium berghei from Sporozoites.
Medical research progress rept.,
C. P. A. Strome, P. L. DeSantis, and R. L. Beaudoin. 5 Feb 79, 8p NMRI-79-77
Contract N00014-76-C-1132
Pub. in In Vitro, v15 n7 p531-536 1979. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A079 768/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Engraftment of Bone Marrow Transplants in W Anemic Mice Measured by Electronic Determination of the Red Blood Cell Size Profile.
Medical research progress rept.,
Wieslaw Wiktor-Jedrzejczak, Saul J. Sharkis, Aftab Ahmed, Lyle L. Sensenbrenner, and Kenneth W. Sell. 26 Oct 78, 12p Rept no. NMRI-79-76
Pub. in Experimental Hematology, v7 n8 p416-424 Sep 79.

No abstract available.

AD-A079 769/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD

Freeze-Dried Canine Vena Cava Allografts as Mesocaval Shunts.
Final rept.,
M. H. Goldman, D. Brickley-Parsons, W. J. Fouty, D. A. Floering, and D. B. Colvin. 1978, 10p Rept no. NMRI-78-122
Pub. in Transactions of American Society for Artificial Internal Organs, v24 p193-199 1978.

No abstract available.

AD-A079 770/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
In vivo Induction of Carrier-Specific Cyclophosphamide-Sensitive Suppressor Cells for Cell-Mediated Immunity in Mice.
Medical research progress rept.,
A. M. Attaliah, A. Ahmed, and K. W. Sell. 8 Jan 79, 11p Rept no. NMRI-79-73
Pub. in International Archives of Allergy and Applied Immunology, v60 p178-185 1979.

No abstract available.

AD-A079 772/0 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Prostaglandins Influence Nutrient Perfusion in Brain during the Postischemic Period.
Medical research progress rept.,
John M. Hallenbeck, and T. W. Furlow, Jr. 1979, 15p Rept no. NMRI-79-74
Pub. in Protacyclin, p299-310 1979.

No abstract available.

AD-A079 773/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Rapid, Large-Scale Isolation of Plasmodium berghei Sporozoites from Infected Mosquitoes.
Medical research progress rept.,
N. D. Pacheco, C. P. A. Strome, F. Mitchell, M. P. Bawden, and R. L. Beaudoin. 29 Aug 78, 7p Rept no. NMRI-79-75
Pub. in Jnl. of Parasitology, v65 n3 p414-417 Jun 79.

No abstract available.

AD-A079 774/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Reactivity of Lewis Lymph Node and Bone Marrow Cells to F344 Non-AgB Histocompatibility Antigens.
Medical research progress rept.,
C. J. Schlagel, and D. M. Lubaroff. 1979, 4p Rept no. NMRI-79-70
Pub. in Transplantation Proceedings, v11 n2 p1349-1350 Jun 79.

No abstract available.

AD-A079 775/3 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Role of a Nonimmunoglobulin Cell Surface Determinant in the Activation of B Lymphocytes by Thymus-Independent Antigens.
Medical research progress rept.,
Bondada Subbarao, Donald E. Mosier, Aftab Ahmed, James J. Mond, and Irwin Scher. 18 Oct 79, 15p Rept no. MNRI-79-72
Pub in Jnl. of Experimental Medicine, v149 p459-506 1979.

No abstract available.

AD-A079 800/9 PC **A02**/MF **A01**
Public Research Inst Alexandria VA
Does Licensing Improve the Quality of Service: The Case of Dentists.
Arlene Holen, Paul Feldman, and James Jondrow. Nov 79, 25p Rept no. CRC-405

In 1970, about 500 occupations were licensed by one or more states in the U.S. and over 2000 were regulated at the local level. The fact that licensing is so widespread suggests that it must provide some benefits to the public, perhaps by eliminating from the market some low quality services that most consumers feel they would only have bought by mistake. It may also result in higher prices, however, without improving the quality of services available.

AD-A079 820/7 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda MD
Serum Glycoproteins in Patients with Brain Tumors: Relation to Tumor Presence and Immune Status,
J. F. Weiss, R. A. Morantz, W. R. Meeker, Jr., W. P. Bradley, and A. M. Baskies. 1979, 14p
Pub. in Multidisciplinary Aspects of Brain Tumor Therapy, p123-134 1979.

No abstract available.

AD-A079 908/0 PC **A05**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
Normative Bilateral Brainstem Evoked Response Data for a Naval Aviation Student Population: Group Statistics.
Interim rept.,
W. Carroll Hixson, and James D. Mosko. 7 Aug 79, 85p Rept no. NAMRL-1262

A biomedical instrumentation capability has been developed and exploratory research has been initiated to investigate the potential contributions of brainstem auditory evoked response technology to aviation medicine. Brainstem data based upon simultaneous ipsilateral and contralateral recordings have been collected and analysed for a selected population (age 20 to 24 years) of naval aviation students. An extensive set of statistical tables is provided for both the ipsilateral and contralateral data which establishes the normative range of brainstem responses for the study population.

AD-A079 909/8 PC **A04**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
Exploratory Assessment of Automated Hearing Test Systems.
Final rept.,
Ronald M. Robertson, James W. Greene, Donald W. Maxwell, and Carl E. Williams. 2 Oct 79, 52p Rept no. NAMRL-1263

Microprocessor-controlled audiometers produce, within acceptable variation, hearing threshold levels comparable to those obtained with manual audiometry and within similar time frames. The new generation of audiometers makes it possible for any threshold seeking procedure to be programmed and standardized at all test locations. Moreover, these automated hearing test instruments can also be programmed to provide fault detection algorithms which make it difficult for individuals to falsify the audiometric data. Tentative performance specifications have been identified for the development of an MCA for use in Navy hearing conservation programs. Since none of the instruments evaluated incorporates all of the tentative specifications, it would be premature for the Navy to purchase any off-the-shelf MCAs for use in its hearing conservation programs.

AD-A079 948/6 PC **A04**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
Airsickness during Naval Flight Officer Training: Basic Squadron VT-10.
Interim rept.,
W. Carroll Hixson, Fred E. Guedry, Jr., Garry L. Holtzman, J. Michael Lentz, and Patrick F. O'Connell. 8 Apr 79, 72p Rept no. NAMRL-1258

This report is the first in a series dealing with a longitudinal study of Naval Flight Officer airsickness in the Basic, Advanced, and Fleet Readiness (RAG) squadrons comprising the complete training program. Data from 5,394 hops flown by 408 VT-10 students indicate that airsickness occurred on approximately 16 percent of the total hops flown, vomiting occurred on 7 percent of the total, and performance degradation caused by airsickness occurred on 11 percent of the flights. Approximately 74 percent of the students reported being airsick on at least one flight, 39 percent reported vomiting on one or more flights, and 59 percent considered their flight performance to have been degraded by airsickness on one or more hops. The report details the incidence of airsickness by hops and by students; presents the results of several brief motion reactivity tests to which a large segment of the population was exposed; and relates the flight and test data for different student subpopulations. (Author)

AD-A079 974/2 PC **A04**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Transactions of the Institute of Poliomyelitis and Encephalitis. Medical Virology (Selected Articles),
Ye. V. Leshchinskaya, M. P. Chumakov, I. N.Martynenko, Ye. A. Tkachenko, and L. B. El'bert. 28 Aug 79, 54p Rept no. FTD-ID(RS)T-1183-79
Unedited machine trans. of Trudy Instituta Poliomiyelita i Virusnykh Entsefalitov, Meditsinskaya Virusologiya (USSR) v21 n2 p126-148 1973.

No abstract available.

AD-A080 017/7 PC **A03**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
The Limiting Effects of Astigmatism on Visual Performance through Periscopes.
Interim rept.,
S. M. Luria, Jo Ann S. Kinney, C. L. Schlichting, and A. P. Ryan. 1 Oct 79, 35p Rept no. NSMRL-905

The performance of observers with various degrees of astigmatic error (ranging from 0 to +6D) was compared through the old and new periscopes. In daytime viewing, observers with 4D of astigmatism could see as well through the new 12 power periscope as observers with 2D (the present maximum allowed under Navy standards) could see through the old periscope. With the new 24 power periscope, observers with 6D of astigmatism did even better than 2D astigmats through the old periscope. Additional experiments showed that equivalent results are obtained with either gratings or ship silhouettes, and whether natural or unduced astigmats are the observers. (Author)

AD-A080 018/5 PC **A02**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
Flight Physical Standards of the 1980's: Spinal Column Considerations.
Technical rept.,
Leon E. Kazarian, and William F. Belk . Oct 79, 22p Rept no. AMRL-TR-79-74

The introduction of a new generation of high performance fighter (HPF) aircraft (f-15, F-16, A-10) into the inventory makes it essential that physical standards used for both the selection and continued qualification of pilots for these systems be carefully reviewed. It is felt that HPF selectees should require additional radiological examinations to insure they do not have architectural anomalies of the spinal column that could be aggravated by or potentially result in pilot incapacitation while flying or during emergency escape. This paper provides a critical biomechanical analysis of the role of selected preexisting congenital anomalies or diseases as a source of decreased spinal tolerance.

AD-A080 026/8 PC **A02**/MF **A01**
Tanta Univ (Egypt) Dept of Bacteriology
Annual Report 1,2 (4th).
Rept. for Aug 78-Aug 79,
A. Abdel Aziz. 1 Aug 79, 19p
Contract N00014-75-C-1002

Examination of suspected infective enteritis in infants and children was carried out in 2 places, on in Tanta university hospitals (Pediatric Department) and is practically an extension of the investigations carried out on the same group in earlier reports, the other in Assiut in the depth of upper Egypt. The serotypes of the salmonella and shigella are still in investigation. The serotypes of the Escherichia coli belonged nearly to the same range like that met with in Tanta with some difference in the frequency of the different serotypes. Investigation of outbreaks of food poisoning was carried out mainly in Tanta, and through the year starting from August 1978, reported out-breaks that were sent to the University hospital and El Minshawi hospital numbered 101, and the cases investigated were 645.

AD-A080 027/6 PC **A02**/MF **A01**
Agouza Serum and Vaccine Inst Cairo (Egypt)
Cholera Vaccine.
Rept. no. 3 (Annual) 15 Jun 76-14 Jun 77,
Violet Takla Rizk. 14 Jun 77, 11p

Contract N00014-74-C-0392

The vaccine field trial which was carried out in a village named Ballacks in Kalyoubia Province was preceded in November and December 1975 by a house to house census after dividing the area into 4 districts. Every district was given a separate code number, the families were numbered serially within the village and individuals within each family were given a serial number. Only adults were accepted in the trial. Four serological surveys were planned to be made on the vaccine recepients, who were all adult individuals. On the whole, general reactions to all vaccines used were rare; for follow up of vaccinees the field team searched for anorexia, nausea, vomiting, headache, fever, rigors, arthralgia, myalgia and asthenia, but they spotted only a few cases of fever, headache, nausea, arthralgia and one case of shock which happened instantaneously after injection of the vaccine which was the formalin-inactivated formalin neutralised vaccine. Patient was resuscitated by giving him decadon and adrenaline. A good percentage suffered various degrees of local reactions, local erythema, swelling, induration and glands were looked for. The formalin-inactivated, formalin-unneutralized cholera vaccine caused more of these local reactions than the other vaccines did.

AD-A080 030/0 PC **A23**/MF **A01**
California Univ San Francisco
Studies on Molluscicidal and Other Properties of the Endod Plant, Phytolacca dodecandra.
Final rept.,
Aklilu Lemma, Donald Heyneman, and Helmut Kloos. Jun 79, 537p
Contract N00014-76-C-0218

No abstract available.

AD-A080 077/1 PC **A08**/MF **A01**
Ain Shams Univ Cairo (Egypt) Faculty of Science
Entomological (Biological-Ecological-Toxicological-Cytogenetic) and Parasitological Studies in Relation to Malaria and Its Responsible Vectors in Egypt.
Annual rept. no. 2,
A. A. Soliman. 1 Jun 79, 170p
Grant N00014-77-G-0044

During the period (1977-1978) malariometric surveys were carried out in some localities of seven governorates. These localities were selected on geographical and epidemiological basis. The results of the blood surveys provided base line data. The blood surveys were divided into: (1) Spot surveys : Carried out in the Delta governorates, the Oasis and Aswan; and (2) Longitudinal surveys : Carried out in the areas where malaria prevails during the four seasons of the year. However, from the epidemiological point of view, it is the incidence of malaria that is of particular importance since it indicated the continuty of local transmission.

HRP-0026890/4 Not Available NTIS
George Washington Univ. Medical Center, Washington, DC.
Nurse Practitioner Has a Central Role in Hospital Health Service.
Cynthia Dunbar. 1978, 3p
Pub. in Occupational Health and Safety v47 n4 p46-48 Jul-Aug 78.

A description is provided of the role of the nurse practitioner in the employee health service at George Washington University Medical Center, D.C. The health service is directed by the nurse practitioner and backup services are provided by physicians. It is the nurse practitioner's responsibility to establish a health service for the employees. The employee health service was conceived of as a screening and minor treatment area where counseling and referral would be provided. A discussion of the nurse practitioner's clinical, administrative and educational activities is presented. These include the budget, policies, and procedures. Opportunities for health teaching during the physical examination or the evaluation of walk-in patients' complaints are explored. Formal presentations on various diseases such as hypertension, communicable diseases, and common skin conditions, are scheduled for the benefit of the employees. Nurse practitioner students are able to gain clinical experience under direct supervision. The nurse practitioner in an employee health service can meet the needs of ill individuals who do not require a physician; as long as procedures are maintained, both the hospital and the employee benefit. A table highlights the data presented. A bibliography is included.

HRP-0027190/8 Not Available NTIS
Health Systems Agency of New York City, Inc.
Home Health Care -- Services and Cost.
Geraldine Widmer, Roberta Brill, and Adele Schlosser. 1978, 6p
Pub. in Nursing Outlook v26 n8 p488-493 Aug 78.

Results are presented of a study undertaken by the Visiting Nurse Service of New York and the New York City Health Systems Agency (HSA) of the costs and utilization of home health care. The study's objectives were: to gather data about patients requiring home health care and their use of home health care services when all obstacles to the services were removed; to estimate the cost to the patient and to the third party payors of maintaining the patient at home; and to discover what kinds of reimbursement were available to defray those costs. A community-based home health agency serving a metropolitan subarea with a high concentration of people over 65 and a wide economic range, was chosen to obtain data for clients with a variety of reimbursement arrangements. The services provided are outlined, including: physical therapy, speech therapy, social work services, nursing care, and nutrition consultation. A discussion of the three types of patient classifications is provided, and patients' characteristics are examined. A total of 134 men and 286 women, all chronically ill, participated in the study. It was found that one-third of all incurred costs were not reimbursed by any third-party payor. Most physicians' fees and nursing costs were covered, with housekeeping and home attendant costs comprising 41 percent of nonreimbursable costs. Home health care was found to be considerably cheaper than care rendered in a health-related facility or a skilled nursing institution.

HRP-0027454/8 Not Available NTIS
Washington Adventist Hospital, Takoma Park, MD.
Does Nursing Administration Affect Patient Care.
Jeanne Kinzer. 1978, 4p
Pub. in Supervisor Nurse v9 n9 p84-85, 89-90 Sep 78.

A discussion is provided of the impact of organizational structure and committee input on nursing practice at the unit level. A unique aspect of the care rendered at a Seventh-day Adventist Medical Center in Takoma Park, Md. -- that of praying nightly with the patients as they are being prepared for sleep -- is examined. The facility's guiding principles are examined and compared with the philosophy of nursing service. A discussion is presented of the nurses' yearly goals and a diagram illustrates how they try to make their philosophy and goals a reality in delivering patient care. After goals are set, procedures are outlined and responsibilities are assigned. The responsibility of providing spiritual care is assigned differently to the various categories of nurses. Samples of the job descriptions for division of nursing personnel illustrate this. The nursing service's responsibility of selecting and training personnel who can provide quality nursing care within the Seventh-day Adventist philosophical framework is noted.

HRP-0027625/3 Not Available NTIS
Computer Sciences Corp., Vienna, VA.
Advances in Computer-Based Pharmacy Systems.
Alan M. Weissman, and Ken W. Burleson. 1978, 4p
Prepared in cooperation with High Point Memorial Hospital, NC.
Pub. in Medical Instrumentation v12 n4 p237-240 Jul-Aug 78.

Advances that took place in computer-based pharmacy information systems between 1958 and 1978 are summarized. Attention is given to the clinical pharmacy applications of pharmacokinetic modeling, drug interaction and adverse drug therapy monitoring, intravenous additive and hyperalimentation programs, drug usage review, drug information services, and drug distribution systems. Also considered are administrative and management control systems and automated label preparation and identification of patients' compliance with therapy. During this period, computers became more and more important in providing pharmaceutical services to the hospitalized patient. Computer use has now expanded to encompass care of the outpatient in institutional pharmacy practice and in community pharmacies. Computers are often used to manage the information-processing requirements within the pharmacy department. When the total integrated hospital information system is developed, the pharmacist will be provided with all the information needed to care for a patient effectively. The physician will have access to pharmacy records to retrieve a specific patient's individual records; to use of pharmacokinetic routines stored in the computer; to drug information retrieval; and to antibiotic prescribing information.

HRP-0027965/3 Not Available NTIS
Children's Hospital Medical Center, Boston, MA.
Baccalaureate Nursing Students as Leaders in Geriatric Groups.
Sally J. Everson, and Anne Roe Mealey. 1978, 10p
Pub. in Jnl. of Nursing Education v17 n7 p17-26 Sep 78.

The use of group dynamics by baccalaureate nurses in helping the elderly cope with the experiences of aging is discussed. Group work requires a contract covering purpose (primary socialization), composition, size (5 to 10 selected patients), time, duration, confidentiality, and voluntary participation. The group proceeds in four phases (orientation, early working, late working, and termination) which may be cyclical. Significant for the function of the group are unifying themes, predominant feelings, and the nature of the interaction process. Actual group development involves selection of a time and place; establishment of a contract; increased self-confidence through life review (orientation); emergence of testing behaviors and hostility (early working phase); growth of mutual sharing and self-disclosure (late working); and termination. Feelings of depression are often experienced by baccalaureate nurses in initial stages of group treatment and can be overcome by weekly conferences between the coleader and instructor and weekly meetings of all students with the instructor; the situation improves as personal relationships form and as student nurses learn to recognize group mechanisms and themes. A survey of community agencies has shown that clients' behavior is positively modified in many cases.

HRP-0027985/1 Not Available NTIS
Temple Univ., Philadelphia, PA. School of Medicine.
Financial Considerations of Laboratory Management in an Inner City Hospital.
Victor H. Auerbach. 1977, 9p
Pub. in IEEE Transactions on Systems, Man, and Cybernetics vSMC7 n3 p192-200 Mar 77.

A model for producing a break-even situation in inner city teaching hospital laboratories is presented. Formulas for establishing whether a hospital laboratory is operating at a profit have become more complex since the advent of Medicare, especially because charges are handled differently in the inpatient area (i.e., an all-inclusive per diem rate for Blue Shield) and because of State requirements for charges under medical assistance programs. Increasing the paying outpatient variable raises the profit value and profits can be increased by greater efficiency; but new capital investment requirements, to cover greater work volume, limit profit increases. Adjustment of the inpatient work variable shows that more work may also be done here without changing fixed costs. Analysis of joint effects indicates that increasing the outpatient workload leads to greater profit and decreased contributions per diem. Manipulation of the ratio of billings to costs suggests that profitability increases with more third-party insurance or self-paying patients, and with more outpatient laboratory activities. It is concluded that community hospitals can profit under Medicare regulations, but that inner city teaching hospitals must raise their prices or lower their costs just to survive, and therefore need different standards and guidelines. Six tables are provided.

HRP-0028099/0 Not Available NTIS
Health Organization.
Andre Wynen. 1978, 3p
Pub. in World Medical Jnl. v25 n3 p34-36 1978.

The main reasons for the deficiencies in the health systems of Belgium and England are the inconsistencies in and lack of respect for, actuarial rules and the most basic social-economic criteria. In England the main problem has been to integrate a nationalized medical service into a society which is not state-controlled as well as into a noncollectivist economy. The development of a parallel private patient system is the most regrettable negative element in this contradictory setup. In Belgium the system may be called an insurance system, but it does not enforce many of the basic principles of administration. It is becoming increasingly difficult to envisage finding a solution for the problem of health insurance without also solving fundamental problems with a rapidly evolving medical science. Instead of raising the problems of health policy only when there is a financial crisis, under the pressure of events, there must be a determined desire to tackle these difficult problems in a rational and controlled manner.

HRP-0028194/9 Not Available NTIS
Health Systems Agencies (HSA's) and Hospitals -- Counter-Planning Strategies.
Gordon D. Brown. 1978, 10p
Pub. in Hospital and Health Services Administration v23 n4 p65-74 Fall 1978.

Given the dispersed nature of power in the U.S. health system, planning methods must balance technical and political aspects of decisionmaking. Planning and regulatory techniques must take into account how services or delivery processes are valued. Unfortunately, health systems agencies' attempts to implement technical solutions are often rendered ineffective due to counterplanning strategies of other parties. For instance, a hospital's counterplanning strategies might consist of such practices as disregarding imposed solutions, or intentionally distorting information on which solutions are based. If a decentralized planning structure is to be effective, hospitals and other provider institutions must bring their planning into closer association with administrative and clinical health functions. Decentralized planning can be more responsive and adaptive to local demands for services because greater community participation can be generated. Measurement and reporting of health needs can also be less formal and complex if planners work closely with community representatives.

HRP-0028200/4 Not Available NTIS
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Acceptance of the Physician Assistant by Non-physician Health Professionals in the Indian Health Service.
Lawrence D. Weiss. 1978, 9p
Contract DHEW-245-76-0113
Pub. in the P.A. Jnl. v8 n3 p171-179 Fall 1978.

While some problems do arise, relations between nonphysician health workers and physicians' assistants (PA's) in the Indian Health Service (IHS) are generally satisfactory. This conclusion was reached in a study based on a survey of 55 licensed practical nurses (LPN's), registered nurses (RN's), and pharmacists in the Albuquerque and Navajo areas of the IHS at a sample of sites where PA's had been working for more than two years. Overall, the PA's appeared to have gained general acceptance, though there were significant differences between the responses of LPN's and RN's, with the latter group registering more conflict and less support for the PA's. Nevertheless, more than half of the respondents felt that health care had improved in their respective clinics as a result of the addition of the PA. Most nurses perceived the PA's base of knowledge as adequate for making independent clinical decisions most of the time. Moreover, nearly all nurses felt that the relationship the PA is able to establish with patients is either as good as, or better than, the typical physician-patient relationship. Pharmacists were also satisfied with the skills of PA's in areas related to pharmacy.

HRP-0028201/2 Not Available NTIS
Georgia Inst. of Tech., Atlanta.
Impacts of Health Maintenance Organization Growth on Community Health Care Costs.
Thomas E. Ramsay, and Richard D. Wright. 1978, 9p
Pub. in Socio-Economic Planning Sciences v12 n5 p241-249 1978.

Although health maintenance organizations (HMO's) can significantly reduce health costs when they share hospital resources with the traditional sector, they could achieve even greater savings and growth if they were to control captive hospitals. That is the major conclusion drawn from this study, based on HMO and comparative health cost data. A model of HMO growth and traditional health system response is proposed. Utilization, occupancy, inflation rates, and costs and staffing figures for HMO's were based on Kaiser-Permanente, Social Security, and Georgia State University conference figures. HMO hospital ownership is demonstrated to produce the maximum cost savings and community impact possible. Six other hypothetical situations, vis-a-vis HMO's are simulated and their impacts assessed. Results suggest that HMO's can successfully expand and usefully influence community health costs even when they must share hospital resources. Projections imply a tremendous potential for HMO expansion. While HMO growth would reduce total community health costs, a substantial fraction of HMO subscribers' savings is added to the cost of other subscribers.

HRP-0028222/8 Not Available NTIS
Dental Health -- A Community Responsibility.
M. N. Naylor. 1978, 7p
Presented to the Society of Cosmetic Chemists of Great Britain, Mar 2, 1978.
Pub. in Jnl. of the Society of Cosmetic Chemists v29 n4 p227-233 1978.

Good dental health in Great Britain depends ultimately on community and individual commitment to sound dental practices. Both tooth decay and periodontal disease can be prevented if dental plaque formation is interdicted by proper brushing, flossing, and community fluoridation programs. While there are chemotherapeutic drugs which can destroy plaque organisms, plaque control by this means is not advisable. All the complex and sophisticated surgical procedures available are doomed to failure unless supported by regular and effective removal of microbial deposits. The composition of the diet is also extremely important in determining decay experience. Sucrose, especially when consumed between meals, profoundly increases decay. Dental health education must emphasize the differences between right and wrong patterns of sugar consumption. Perhaps the one and only true community measure to prevent decay is fluoridation. Fluoridation exerts its effect systemically, the fluoride ions being absorbed intestinally and, via the bloodstream, becoming incorporated into the crystalline structure of the tooth enamel during the development period. Early studies indicate that fluoride mouthwashes can also contribute significantly to decay prevention. A much greater commitment by the British public and individual citizens is necessary if dental health is to be improved.

HRP-0028226/9 Not Available NTIS
Maine Medical Center, Portland.
Analysis of the Specialty and Geographic Location of Physician Assistants in the United States.
Henry B. Perry. 1978, 3p
Pub. in American Jnl. of Public Health v68 n10 p1019-1021 Oct 78.

In late 1974 and early 1975, 933 physicians' assistants (PA's) were surveyed in order to identify those who chose employment in a primary care field or in a rural medically underserved area. Respondents included graduates of 8 PA programs, 4 MEDEX programs, 2 military-sponsored programs, and 18 other civilian programs. Survey questions ranged over topics including educational background, experience, specialty, and characteristics of the geographic locale in which the PA located. Only two factors were found to be significantly related to PA's choice of specialty and geographic location: type of PA program attended and sex. Almost all MEDEX and military graduates work in primary care fields. MEDEX graduates are also considerably more likely than other civilian PA's to be working in smaller communities. Men are somewhat more likely than women to choose general primary care and surgical specialties, whereas a greater proportion of women choose specialty primary care fields. Women PA's also tend to practice in larger communities. The MEDEX program's deployment strategy, incorporating identification of communities in need of additional manpower and the establishment of incentives for physicians in these communities to help train and then hire MEDEX graduates, may enhance the effectiveness of other PA programs in producing graduates for medically underserved areas.

HRP-0028227/7 Not Available NTIS
Vanderbilt Univ., Nashville, TN. School of Medicine.
Cost of Coronary Bypass Procedures.
William S. Stoney, William C. Alford, George R. Burrus, Robert A. Frist, and Clarence S. Thomas. 1978, 3p
Pub. in Jnl. of the American Medical Association v240 n21 p2278-2280 17 Nov 78.

Although the benefits of coronary bypass surgery remain controversial, such operations are increasing in frequency and in cost and represent a substantial part of total national health expenditures. This study is based on a review of the financial records of 200 successive patients who underwent the bypass operation in the first 3 months of 1976. To compare costs per year, the hospital costs of the first 20 patients of each year from 1971 through 1977 were obtained. The data revealed an average hospital bill of $7,700 in 1976, compared to $5,000 in 1971. The total hospital cost for the 200 patients was approximately $1,540,000. A substantial loss was recorded for Medicare patients, though some was recovered from other Medicare patients with a lower cost per day of illness. Increasing costs for cardiac surgery are due in part to the increased use of laboratory and other supportive equipment and services. In terms of operative mortality, the cost-effectiveness of this procedure has been favorable. However, a substantial cost reduction could be made by having a specialized hospital, or portion of a hospital, set aside for coronary artery disease. Self-care would be stressed in diagnostic procedures, a structured plan of patient care would direct the operative and postoperative period, and extended care could be utilized during the late postoperative hospital stay. Three graphic figures are included.

HRP-0028230/1 Not Available NTIS
City Coll., New York.
Children's Views of Health -- A Developmental Study.
Janet Nielson Natapoff. 1978, 6p
Pub. in American Jnl. of Public Health v68 n10 p995-1000 Oct 78.

Children define health more positively than it is defined by most health professionals. This finding was reached in an analysis of interviews with 264 first, fourth, and seventh grade New Jersey children. Three main questions were asked: (1) what does the word health mean; (2) how do you feel when you are healthy and how can you tell when a family member is healthy; and (3) can you be part healthy and part not healthy at the same time. Rather than seeing health as the absence of symptoms, most children stressed feeling good and being able to participate in desired activities. The children's ideas were also found to mature with age. Abstract qualities like mental health enter into the concept of health as the child approaches adolescence. First graders saw health as a series of specific health practices, e.g., getting exercise and keeping clean. A person could not be both healthy and unhealthy at the same time. Fourth graders were less concerned with specific health practices and more concerned with total body states, such as feeling good. Seventh graders, in increasing numbers, indicated an awareness of mental health.

HRP-0028231/9 Not Available NTIS
Tennessee Univ., Memphis Coll. of Medicine.
Characteristics of Hospitalized Tuberculous Patients Today.
Harry L. Davis, William G. White, and Wheelan D. Sutliff. 1978, 3p
Presented at the Southern Medical Association 71st Annual Scientific Assembly, Dallas, TX, Nov 77.

Pub. in Southern Medical Jnl. v71 n11 p1401-1403 Nov 78.

Tuberculosis patients referred to hospitals today, though drastically reduced in numbers, tend to be more seriously ill than in the past. Of patients with tuberculosis, who were discharged consecutively from the University of Tennessee Hospital in 1975 and 1976, 149 were studied retrospectively. Factors complicating their tuberculosis and rendering treatment more difficult included advanced age, alcoholism, debility from multiple chronic diseases, drug resistance, and recalcitrance. The treatment of tuberculosis in this setting requires a wide-ranging diagnostic and therapeutic approach. Despite the seriousness of their condition, 118 patients showed bacteriologic and/or roentgenographic evidence of improvement during an average hospitalization of 2 to 4 months. These patients differ from those formerly hospitalized and differ even more radically from those currently receiving ambulatory therapy. An unexpectedly high number of patients had micro-organisms which were resistant to one or more antituberculosis drugs, growing to one-half the degree of growth in the control. Therapy regimens utilized reflected physicians' preferences and extent of the disease. The most common drug regimen consisted of isoniazid plus another drug, sometimes alternating monthly with streptomycin.

HRP-0028234/3 Not Available NTIS
Saint Catherine Hospital of East Chicago, IN.
Cardiac Rehabilitation Program Focuses on Total Patient.
Paul S. Fardy. 1978, 6p
Pub. in Hospitals, Jnl. of the American Hospital Association v52 n21 p101-102, 104, 106-108 1 Nov 78.

The cardiac rehabilitation program initiated by St. Catherine Hospital in East Chicago, Ind., in 1976 emphasized both psychosocial and physical improvement of participants. A multifaceted approach consisting of three phases is utilized: (1) an in-hospital convalescent stage; (2) an outpatient exercise program conducted in a minigymnasium within the hospital; and (3) an outpatient program based at a local community center. Each participant undergoes a thorough physical examination before moving from one stage to another in the program. Patient and family education and counseling are integral parts of the program. Rehabilitation nurses collaborate with physicians, exercise specialists, dietitians, physical therapists, and others in coordinating a patient's individual regime. Three main objectives are pursued: enhancement of physiological function and psychosocial well-being; positive changes in attitudes; and changes in lifestyle as a result of patient education. Reevaluation of 80 participants after 3 months of physical training and education indicated that they had improved considerably in regard to cardiovascular function, physical work capacity, cholesterol and triglyceride blood levels, smoking and drinking habits, and sexual function.

HRP-0028250/9 Not Available NTIS
Rehabilitation Services Administration, Washington, DC.
Independent Living (IL) -- A Legislative View.
Kathaleen C. Arneson. 1978, 2p
Pub. in American Rehabilitation v3 n6 p31-32 1978.

Legislation recently introduced into Congress has stressed 'independent living' as a goal for the physically handicapped. The evolution of that goal has progressed through five stages. The first emphasized aids to daily living, that is, teaching impaired people to attend to their daily needs. The second stage focused on providing services to the severely disabled who had no clear vocational potential in order to help them to cope with the environment; legislation focused on removing physical barriers to the disabled and on providing housing. The third stage emphasized developing the person to a stage just short of employment. Among the goals were deinstitutionalization, lessened dependence on family members, and independence in homemaking. The fourth stage involved self-help in the concept of services in centers for independent living. This involves peer group counseling, small business activity, community education action programs, and general advocacy programs. The fifth stage is comprehensive services for the severely disabled. Legislation has been recently introduced by both Congress and the Administration that would provide continuing services for the severely disabled, e.g., living assistance, infant and preschool services, nonvocational social development assistance, and individualized case management.

HRP-0028255/8 Not Available NTIS
Hospital System Takes a Look at 'Shrinking' Itself.
Emily Friedman. 1978, 7p
Pub. in Hospitals, the Jnl. of the American Hospital Association v52 n21 p90-96 Nov 78.

In order to maintain quality of care with limited fiscal resources, hospitals across the country are experimenting with ways to reduce the number of beds and reduce the size of the hospital system. Where regulations allow, some hospitals are reducing the number of acute care beds by instituting 'swing' beds. That entails beds that can be used for acute care cases or long-term care, depending on the immediate needs of the particular hospital. Multiple-use beds are particularly attractive to rural hospitals, where the only other alternative for long-term care cases is to be sent to hospitals or nursing homes that are much farther away. In urban areas, an increasingly popular idea is the formation of consortiums of previously independent hospitals. One such consortium was formed in Rochester, N.Y., among nine hospitals. The hospitals operate as a single entity, use a single planning board, and put out joint financial statements. Other such consortiums operate in Baltimore, Md. (among six hospitals), and in parts of Pennsylvania.

HRP-0028280/6 Not Available NTIS
Texas Univ. Health Science Center at Houston. School of Public Health.
Multivariate Analysis of the Likelihood and Volume of Preventive Visit Demand in a Prepaid Group Practice.
David R. Larison, and J. Michael Swint. 1978, 10p
Pub. in Medical Care v16 n9 p730-739 Sep 78.

The economic factors that influence people to make preventive medical visits were analyzed in this study of 3,892 individuals enrolled in the Kaiser Foundation Prepaid Health Plan of Portland, Oreg. Preventive visits included general medical examinations, eye examinations, well-child care, and immunizations. Those factors that were most significant were income, coinsurance, education, and family size. Females were more likely to make preventive visits than were males, and the very young and the very old were more likely to make visits than other age groups. The researchers found that since patients pay only a dollar or two for each visit, the payment was not a significant factor in making preventive visits. Curiously, the availability of sick leave was not a factor in making preventive visits, nor was the perceived health of the individual. The data were analyzed using multiple regression equations. Three tables present the data in detail.

HRP-0028282/2 Not Available NTIS
California Univ., Berkeley. School of Public Health.
Minority Dental School Graduates -- Do They Serve Minority Communities.
Roberto Montoya, David Hayes-Bautista, Luis Gonzales, and Edward Smeloff. 1978, 3p
Pub. in the American Jnl. of Public Health v68 n10 p1017-1019 Oct 78.

After graduation, minority dental students usually establish their practices in minority communities. This study obtained the names of 48 minority dental graduates from the University of California at San Francisco, the University of California at Los Angeles, and the University of Southern California, who had graduated between 1969 and 1975 and were licensed to practice in California as of June 1, 1977. About 84.5 percent of the dentists estimated that their minority patients comprised more than 50 percent of their patient load. About 47.7 percent of the dentists had a minority patient load of 80 percent or more. Those figures compare with the general population of California, of which about 27 percent are minorities. A second part of the survey showed that about 60 percent of the dentists located their practices in areas designated as critical health manpower shortage areas (CHMSA's). Since CHMSA's in California usually have a high concentration of minorities, these data tend to reinforce the observation that minority dentists are locating their practices where they can be readily accessible to a minority population.

HRP-0028287/1 Not Available NTIS
Children's Hospital Medical Center, Boston, MA.
Medical Care of Mentally Retarded Persons in Public Residential Facilities.
Richard P. Nelson, and Allen C. Crocker. 1978, 6p
Pub. in the New England Jnl. of Medicine v299 n19 p1039-1044 9 Nov 78.

The affiliation of a teaching hospital with an institution for the mentally retarded is described. The Children's Hospital Medical Center affiliation with Wrentham State School in Massachusetts assures better medical care for Wrentham's retarded clients, and increases physicians' knowledge and effectiveness in dealing with retarded patients. Early initiation of appropriate treatment can preserve or restore capacities that are crucial to the acquisition of self-maintenance skills or vocational abilities. Provision of health services to institutions must have a general rehabilitative, as well as the traditionally medical, component. Children's Hospital physicians utilize a multidisciplinary team approach to provide for the continuing care of Wrentham patients. Programs encompass a wide range of programs, from physical therapy and psychiatry to nutrition, pharmacy, and recreation therapy. Opportunities for educational experiences for medical students through affiliation are extensive. Physicians are also exposed to the human dimensions of serious mental disability.

HRP-0028290/5 Not Available NTIS
National Inst. of Mental Health, Rockville, MD.
Will Community Mental Health Survive in the 1980s.
Steven S. Sharfstein. 1978, 3p
Pub. in the American Jnl. of Psychiatry v135 n11 p1363-1365 Nov 78.

In order to preserve the federally funded community mental health center (CMHC) program, requirements and expectations surrounding the program must be brought into line with fiscal realities. From its inception in 1963, the program has been hampered by a large gap between idealistic expectations and ever-expanding responsibilities to the community and appropriated funding to back these ambitious projects. From 5 essential services, the comprehensive concept was expanded to 12 services, including those for the elderly and persons with alcohol and drug abuse problems. One hundred twenty-three projects had been recommended for approval but remained unfunded in fiscal year (FY) 1976. By the end of FY 1977, the approved but unpaid account amounted to $37.8 million. One potential source of funds for CMHC survival is health insurance. However, insurance is based on a medical model, while the trend in CMHC's seems to indicate a shift away from the medical approach toward a 'social' model. A major problem that CMHC's face is that there is great difficulty in obtaining third-party coverage. Steps must be taken to help the program survive and adapt, using Federal dollars, health dollars, and private funds.

HRP-0028292/1 Not Available NTIS
Sudbury Memorial Hospital (Ontario).
Use of a Microcomputer in a Three-Physician Practice.
G. F. Trobridge. 1978, 3p
Pub. in the Canadian Medical Association Jnl. v119 n7 p770, 772, 811 7 Oct 78.

The computer described here is used in a private practice by three physicians working in cardiology and chest diseases. The physicians work at clinics and in all three hospitals in Sudbury, Ontario (Canada). The computer, used primarily for billing and long-term followup visits, consists of four main parts: a central processing unit, a mass storage system, an interactive input terminal, and a hard copy printer. The most important uses of the computer in saving office costs are in accounting and practice management. Accounting costs are estimated to have been reduced by two-thirds. In addi-

tion, the more reliable followup system is expected to enhance the reputation of the practice. The data are stored on 'floppy' disks. Separate disks are used for specific high-volume visits, e.g., for pacemaker followup and for cardiac catheterizations. The computer is also used for research. A separate disk contains all of the records of 2,000 patients whose progress is being followed closely.

HRP-0028294/7 Not Available NTIS
Houston Univ., TX. School of Professional Studies.
Systematic Approach to Evaluating Mental Health Services.
Michael S. Haro. 1978, 5p
Pub. in the Jnl. of School Health v48 n9 p554-558 Nov 78.

Utilization of a systematic approach for evaluating school mental health services can enhance the effectiveness and efficiency of program execution. A model for such systematic evaluation is proposed in this paper. It encompasses assessments of the need, readiness, and targets for change. Existing programs could be assessed through a record of random sample services offered during a particular time interval, time-lapsed data on routine services, or interviews with administrators and/or teachers concerning their perceptions of services rendered by mental health personnel. Evaluative followup questionnaires, given to parents and teachers of students receiving help, might focus on three concerns: (1) whether the program helped them understand and deal with the child more effectively; (2) whether the recommendations were realistic for the parent or teacher and the particular situation; and (3) whether the recommendations produced results. Systematic evaluation of services should facilitate the collection, analysis, and interpretation of data to improve effectiveness of mental health programs.

HRP-0028295/4 Not Available NTIS
Auckland Univ. (New Zealand). Dept. of Community Health.
Sudden Death in Auckland.
G. E. Fraser. 1978, 10p
Pub. in the Australia New Zealand Jnl. of Medicine v8 n5 p490-499 Oct 78.

Sudden cardiac death in Auckland, New Zealand, is analyzed in this paper based on data for a representative sample of all such deaths occurring during a 1-year period. All cases from 125 of Auckland's 313 primary care physicians were included. A significant excess of sudden deaths occurred in the lowest social class. Some evidence indicated an association between sudden death and high alcohol intake. Acute episodes were of three main types: (1) death occurring within 5 minutes of the person apparently being in his normal state of health, including persons who died during sleep; (2) death occurring within 20 minutes of onset of the acute phase; and (3) persons who survived longer than 20 minutes but less than 24 hours. The proportion of cases in each group was 39 percent, 22 percent, and 39 percent, respectively. Incidence figures for Auckland were comparable to most similar communities. It is observed that the most prominent prodromal symptom was lethargy; as a symptom, however, it is difficult to define and is very subjective. It is further noted that an observer, such as the spouse, may have difficulty reporting accurately.

HRP-0028296/2 Not Available NTIS
New York City Dept. of Health.
Study of 128 Deaths in New York City Correctional Facilities (1971-1976) -- Implications for Prisoner Health Care.
Lloyd F. Novick, and Elaine Remmlinger. 1978, 8p
Presented at the 105th Annual Meeting of the American Public Health Association, Nov 1, 1977.
Pub. in Medical Care v16 n9 p749-756 Sep 78.

Traditional medical care programs within the prison can have only marginal success in reducing mortality among prisoners. This conclusion was based on an epidemiological analysis of prison deaths in New York City during a 5-year period. The data were drawn from standard case abstracts, medical and mental health records, and autopsy reports. External causes accounted for 71 of the 128 deaths, with suicide (usually by hanging) the major cause of death. Seventy-one percent of the prisoners' suicides were detainees awaiting trial completion. More than half of the suicides were charged with violent crimes involving physical harm to the victim, including homicide, assault, and sexual offenses. Health programs within prisons should therefore focus on potentially preventable deaths, especially suicide and drug overdose. Attention must also be given to deficiencies of medical care. The most common deficiency is delay in hospitalization of prisoners requiring care. Programs should go beyond identification of individuals at risk for suicide, to provide followup and treatment.

HRP-0028301/0 Not Available NTIS
National Commission on the Cost of Medical Care, Chicago, IL.
National Commission on the Cost of Medical Care, 1976-1977. Volume I -- Commission Recommendations, Task Force Reports, Research Agenda.
1978, 153p
Available from Order Dept. OP-26, American Medical Association, P.O. Box 821, Monroe, WI 53566.

The American Medical Association appointed 27 members to serve on the National Commission on the Cost of Medical Care, which subsequently made 48 recommendations to keep down the cost of medical care. In this document, the recommendations have been divided into seven groups: strengthening price consciousness, private sector cost containment initiatives, guidelines for regulation, cost containment measures within medical practice, supply and distribution of health care providers, research guidelines, and consumer and patient education. The recommendations pertain to such concerns as healthful living, providing incentives to hospitals to limit bed capacity, certificate-of-need in ambulatory settings, decertification of facilities or conversion to other uses, second opinions for surgery, disciplinary measures for physicians, and more family practice physicians. The commission divided itself into four task forces, each of which was to analyze a different aspect of the health care system. The four task forces dealt with the marketplace, demand, supply, and technology. The report of each task force discusses the main issues that affect health care and provides recommendations on cost containment and a bibliography.

HRP-0028477/8 Not Available NTIS
Health Effects Research Lab., Research Triangle Park, NC.
Ambient Oxidant Exposure and Health Costs in the United States, 1973.
Donald G. Gillette. 1977, 3p
Pub. in Jnl. of the Air Pollution Association v27 n4 p329-331 Apr 77.

Problems associated with oxidant air pollution and some of the benefits that can be obtained by reducing oxidant levels are noted. The folllowing symptoms have been observed in individuals exposed to photochemical oxidants: headaches, eye irritation, increased asthma attacks, and decreased performance of athletes and other persons engaged in strenuous exercise. Other effects that have been observed in animal and laboratory experiments included impaired fetal survival, an increased number of mutations, and altered physiological processes. A study was undertaken to compare some of the benefits to be obtained when photochemical oxidant levels are reduced. At approximately 400 monitoring stations throughout the United States, hourly oxidant or ozone concentrations were monitored. The majority of the sites were in major urban areas or in other locations where there were high oxidant concentrations. It was estimated that the total annual health cost attributable to oxidants ranged from $120 million to over $240 million in the United States. The majority of the health costs attributable to oxidant exposure were in southern California. Tables highlight the data.

HRP-0028771/4 Not Available NTIS
Dilemma of Life and Death -- Should We Let Them Die.
Elsie L. Bandman. 1978, 15p
Pub. in Nursing Forum v17 n2 p118-132 1978.

The role of the nurse in implementing and participating in decisions regarding the withholding of treatment is explored. Because nurses are in close daily contact with incurably ill patients and their families, they must examine their own attitudes toward life and death decisions. It is asserted that there is an inherent conflict between the orientation of nursing toward the conservation of life and the role of nurses in implementing decisions to withhold or remove treatment whether or not they agree with such decisions. Philosophical positions regarding euthanasia are reviewed. Examples are presented of decisions utilizing a principle which favors a person's wish to continue living and weighs the degree of justice or injustice to others such as dependents. The difficulty in determining whether a patient's expressed wish to die is genuine or the result of temporary despair is discussed. Communication between the physicians who make decisions to withhold treatment and the nurses who implement these decisions is essential if the nurse is to be effective as a moral agent. An example is presented of a case in which the attending nurses could see no reason for an unexplained order to withhold treatment from a patient. It is argued that a nurse has the right and responsibility to act according to her ethical code or to withdraw from the case because she is ultimately professionally responsible for her acts.

HRP-0028778/9 Not Available NTIS
Is Holistic Medicine Filling a Gap We've Created.
M. Lawrence Podolsky. 1978, 6p
Pub. in Medical Economics p217, 218, 221, 222, 224, 226 11 Dec 78.

This article argues that while holistic medicine should not be viewed as miraculous, it may play an important role in the future by filling the gap between psychiatry and the rest of medicine. Evidence of increasing interest in the holistic approach is seen in the clinics being opened in metropolitan and even rural areas, Government interest in holistic medicine as a possible means of cutting health care costs, and traditional practitioners' referral of some patients to holistic medicine centers. Holistic medicine places emphasis on patient education and responsibility, along with such techniques as biofeedback, acupuncture, yoga, hypnosis, and counseling. This approach makes greater use of preventive and psychosomatic procedures than does traditional medicine. One purpose of the holistic clinic is to eradicate the traditional image of the dominating physician and the subservient patient. It must be emphasized, however, that holistic medicine can have therapeutic drawbacks. It may encourage a false sense of security in a patient, delaying conventional medical care until irreversible complications have set in. More stringent controls and valid studies of the effectiveness of the holistic approach are needed.

HRP-0028781/3 Not Available NTIS
Memorial Sloan-Kettering Cancer Center, New York.
Computerized Tomographic (CT) Scan -- Its Use and Abuse.
Robin Caird Watson. 1978, 4p
Pub. in CA-A Cancer Jnl. for Clinicians v28 n2 p100-103 Mar-Apr 78.

Extensive research is needed to realize the potential and determine the limits of computerized tomographic (CT) scanning. This medical technology is contributing greatly to accurate diagnosis of disease of the head and body. Because the method is noninvasive, it entails minimal trauma and risk for the patient. Another significant application of the CT scanner is its use as a treatment tool for cancer patients. The scan is being incorporated into radiation therapy and chemotherapy protocols. On the other hand, the CT scan has by no means eliminated explorative surgery. Invasive techniques such as angiography provide different sorts of information. With the large selection of diagnostic tests available, it is clear that this aspect of medical practice must be considered in physicians' education. The distribution, costs, and quality control of the CT scanner are problems which demand continuing reappraisal. The medical and lay communities must act together to ensure intelligent and equitable use of the CT scanner.

HRP-0028806/8 Not Available NTIS
University Coll. Hospital Medical School, London (England).

Quality of Prenatal Care.
H. A. Brant. 1978, 6p
Pub. in Midwives Chronicle and Nursing Notes v91 n1090 p313-318 Nov 78.

The effects of quality of prenatal care on quality of surviving infants are explored. The role of faulty obstetrical management in perinatal morbidity in the areas of mental deficiency, epilepsy, and spastic paralysis is considered. It is noted that for each perinatal death there are several damaged survivors, and that one child in seven has a handicap of educational concern. The difficulty of maintaining standards of care within the obstetrical unit is related to continuing education and close supervision of a staff tending to high turnover and inexperience. Chronic risks to the fetus involve maternal factors, maternal disease, and feto-maternal conditions. Chronic risks can usually be identified prior to birth and may be indications for inducing labor. These risks include age, obesity, poor obstetric history, hypertension, renal disease, heart disease, diabetes, premature or postmature delivery, declining placental function, malposition or malpresentation, and multiple pregnancy. Acute risks arise at the end of the pregnancy or during labor. The most striking positive effect of neonatal care in the prevention of cerebral damage is found among premature infants. The effectiveness of prevention programs in reducing maternal factors in risk is reviewed.

HRP-0028856/3 Not Available NTIS
Methodist of Indiana Tailors Patient Computer System to Hospital Routine.
Maria R. Traska. 1978, 4p
Pub. in Modern Healthcare v8 n10 p34-35, 38-39 Oct 78.

The medical information system computer system installed at Methodist Hospital of Indiana, Indianapolis, is described. System users type patient information on a video display matrix terminal. They may add, delete, or change information by using the keyboard or a pen attached to the keyboard. Computer uses for physicians, nurses, admissions clerks, and pharmacy and laboratory personnel are outlined. The system is very flexible, allowing approximately 2,000 of the more than 2,500 requested systems changes to be made within a 4-month period. The elements which have helped to make the system at Methodist Hospital a success are: comprehensive planning by each department before installation, an 18-month implementation schedule, intensive training and testing programs for all potential system users, and the dedication of the people involved in the program. The different types of users at Methodist, the different tests administered, and patients' benefits from the system, including a reduction in nursing errors, are described.

HRP-0028857/1 Not Available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Positive Health Strategy -- A New Commitment to Wellness.
Joseph A. Califano. 1978, 6p
Pub. in American Lung Association Bulletin v64 n9 p5-10 Nov 78.

DHEW Secretary Joseph Califano's call for implementation of a preventive health strategy in the United States is presented. The success of preventive health efforts in the past is a primary reason for continuing those efforts. Diseases such as influenza, pneumonia, diphtheria, tuberculosis and gastrointestinal infections have been virtually wiped out in the United States. Between 1900 and 1974, the average life expectancy for a newborn child increased by 25 years. Preventive medicine is an investment which saves both lives and money. Statistics on runaway medical costs are noted. A preventive health strategy also fosters health with minimal intervention by the health care community and by the Government. Some major prevention programs, including the Child Health Assessment Program and efforts to educate and inform the public about the dangers of smoking, are described. Five major prevention efforts which should be built into the structure of the health care system are examined. Photographs are included.

HRP-0028887/8 Not Available NTIS
Family Hospital and Nursing Home, Milwaukee, WI.

Affecting Nursing Goals in Health Care.
Barbara J. Brown, Kristine Gebbie, and Joan F. Moore. 1978, 15p
Adapted from a presentation at the Annual Convention of the American Hospital Association, Atlanta, GA, Aug 30, 1977.
Pub. in Nursing Administration Quarterly v2 n3 p17-31 1978.

This article postulates that nursing education programs should include more about the impact of participation in power and change on individual nurses. Power is defined as the ability and willingness to affect the behavior of others in bringing about change, and nurses can exercise power in politics if they energize and articulate collectively. Sources of power are hereditary power, economic control, information, charismatic power, and carefully-assembled power (that of persons who study how influence can be accumulated so they can share in decisionmaking). Individually and collectively, nurses have tried various approaches to increase their power. Such approaches include increasing visibility, increasing the number of nurses in governing bodies, professional change, and the women's movement. It is proposed that nursing goals in health care involve a strategy characterized by the development of a constituency and the importance of disciplining nurses to relate effectively to places and people over time. There is inherent power in nursing through the ability to reward or punish, to determine what comes from knowledge and expertise, to exercise influence through resource allocation, and to exercise referral power. The public image of nursing is examined in relation to role commitment, changes in the work setting, and the power struggle in health care organizations.

HRP-0029007/2 Not Available NTIS
Lankenau Hospital, Philadelphia, PA.
Teenage Pregnancy and the Black Community.
Francis L. Hutchins. 1978, 3p
Pub. in Jnl. of the National Medical Association v70 n11 p857-859 1978.

Teenage pregancy and its special significance for the black community is discussed. There is a disproportionate number of pregnancies among black teenagers. Data from an urban population which is 75 percent black reveal a disturbing phenomenon of repeat pregnancies; by age 19, only 45 percent of pregnant adolescents were pregnant for the first time. Of those teenagers who elect to carry their pregnancies, poor prenatal care is characteristic. It is observed that the major medical consequences for the teenage mother are an increase in mortality rate and toxemia of pregnancy. Rates of prematurity and perinatal mortality are also elevated. Pregnancy produces numerous negative consequences for the black teenager, including disruption of education and career goals. Child neglect and abuse result from the teenagers' lack of skills and understanding. This in turn leads to the failure-to-thrive syndrome in the children. Infants born to teenage mothers appear to have lower IQ's. Multiple causes, ranging from prematurity to child abuse, could be responsible for this deleterious impact on the child's intelligence.

HRP-0029030/4 Not Available NTIS
Does Sexual Stereotyping Affect Medical Care.
Marion Zucker Goldstein, Joyce D. Kales, and Carmela F. deRivas. 1978, 3p
Pub. in Pennsylvania Medicine v81 n11 p16-18 Nov 78.

Physicians' attitudes with regard to the emotional and physical health of women are examined. Common stereotypes of feminine behavior must be modified, in view of the greater social and economic responsibilities women are assuming. Medical training places a greater emphasis on scientific knowledge than on psychological, social, and cultural issues and sensitivity awareness. These issues must receive higher priority if the medical profession is to be responsive to the concerns and needs of women. In order for women to make educated and intelligent decisions concerning medical treatment, the entire caregiving process, from time spent in waiting rooms and procedures in examining rooms, to explanations of anatomy and physiology, must be based on physicians' awareness of the patient's desire to be informed and respected. Statistics in the area of emotional health raise questions about stereotypical attitudes toward women in organizational systems. Middle-aged and elderly women require more care, understanding, respect, and concern since most have lost their central roles in life. Physicians must become aware of their own expectations, stereotypes, and office practices in order to respond sensitively to women's emotional needs and physical health image.

HRP-0029035/3 Not Available NTIS
Hospital of the Univ. of Pennsylvania, Philadelphia. Dept. of Physical Medicine and Rehabilitation.
Family Caring Unit -- A Major Consideration in the Long-Term Support System.
Stanley J. Brody, Walter Poulshock, and Carla F. Masciocchi. 1978, 6p
Pub. in the Gerontologist v18 n6 p556-561 1978.

Health systems agencies have, up to this point, based their long-term care planning on the acute care model. This study seeks to provide data for long-term care planning by identifying the variables governing institutional or community placement of the functionally disabled elderly. The analysis compares the disabled elderly, 60 years of age and over, who were residents of public and private nursing homes with those who were clients of home health agencies. The family's role in caring for an elderly relative is examined. Studies identifying the type of assistance made by the family to the elderly relative are noted. The findings indicate that living arrangements emerge as a key variable. Family members are shown to provide the bulk of home health services for the chronically ill and elderly. The family's presence is seen to be a factor in delaying an elderly or chronically ill person's institutionalization. Additional data are needed to adequately plan for a long-term care support system.

HRP-0029571/7 Not Available NTIS
Stemming Hospital Growth -- The Flip Side of Carter's Control Plan.
John K. Iglehart. 1977, 5p
Pub. in National Jnl. v9 n23 p848-852 4 Jun 77.

Included in President Carter's Hospital Cost Containment Act of 1977 was a provision that would place a $2.5 billion annual ceiling on hospital capital expenditures. That was half the current rate of annual spending on hospital facilities. To assure compliance with the ceiling, the Government would cut off Medicare and Medicaid funds for unapproved projects; Federal grants, loan guarantees, and tax subsidies for construction in excess of the ceiling would be denied. The Congressional Budget Office estimated that the full impact of the ceiling would not be felt until 1981, when capital expenditures would total $4.3 billion, rather than the $12.2 billion that they would amount to without the ceiling. In proposing the cost containment measure, the Administration was influenced by two studies, one by the Institute of Medicine, the other by the Bureau of Health Planning and Resources Development, DHEW. Both studies urged that the nation's hospital bed supply be cut by at least 10 percent in the next 5 years. Only 17 of the nation's 205 health service areas would be allowed to expand the number of beds in their regions. The other areas would be required to close two beds before opening one new bed.

HRP-0029667/3 Not Available NTIS
Arizona State Univ., Tempe. Coll. of Nursing.
Clinical Nurse Specialist -- Implementing the Role in a Hospital Setting.
Juanita F. Murphy, and Mary Schmitz. 1979, 3p
Pub. in Jnl. of Nursing Administration v9 n1 p29-31 Jan 79.

The role negotiation process involved in the introduction of the new role of clinical nurse specialist is described by a nurse who was given carte blanche by the administration of a 300-bed hospital to develop her role. This clinical nurse specialist initially found that her perceptions and those of the staff regarding the rewards to be gained from integration of her role into the system were in conflict. The specialist then approached the development of her role from an exchange theory perspective. When applying this theory to role negotiation, the specialist must weigh the rewards to be gained from coworkers' acceptance against those to be gained from autonomous functioning. Other role

set members must consider the potential loss or gain of influence and prestige associated with an increasing division of labor with the specialist. The specialist began to emphasize the complementary contributions to patient care of herself and the staff. Once the complementary components of their roles were recognized, all persons in the role set could better contribute to the care of patients. Recommendations designed to help nursing service administrators assist in role negotiation are offered.

HRP-0029672/3 Not Available NTIS
How to Implement Case Cart Systems for Central Service and Operating Room (OR) Use.
Peggy Ryan. 1978, 18p
Pub. in Hospital Topics v56 n6 p4, 6, 8-10, 37-49 Nov-Dec 78.

Procedures and instruments to aid in the implementation of case cart systems for operating room and central service department use in hospitals were surveyed. Persons included in the survey were asked three general questions that concerned whether case cart systems improve patient care, whether case cart systems decrease the number of personnel in operating rooms or central service departments, and major problems encountered. It was determined that the implementation process requires careful attention to the following: (1) adequate procedures that provide for continuity; (2) interdepartmental rapport conducive to the success of case cart systems; (3) administrative support for the philosophy of a system; (4) capable personnel dedicated to making a system work; (5) budgets adequate for personnel and equipment; and (6) time to plan, organize, assess, evaluate, and teach. Implementation procedures specifically focus on checklists, physician preference cards, computer printout lists, and documentation. Breakdowns in automated systems and operational procedures of case cart systems and backup methods occur and must be taken into account. Of primary importance is the development of an instrument inventory, and a sample checklist for a basic laparotomy kit is included. Centralizing activities for supply processing and distribution require interdepartmental cooperation; no single hospital department can be the only decisionmaker. Operating room case cart systems and centralized processing can be beneficial in terms of the quality and safety of patient care. Procedures for emergency, supply, backup, cardiopulmonary resuscitation, suture, cysto procedures, and orthopedic supply carts are detailed.

HRP-0029695/4 Not Available NTIS
Tennessee Univ. Center for the Health Sciences, Memphis.
Role of Nurse Clinician in Urologic Oncology.
Mark S. Soloway, Melinda Ikard, and Myra Tidwell. 1978, 4p
Presented at the 73rd Annual Meeting, American Urological Association, Inc., Washington, DC, May 25, 1978.
Pub. in Urology v12 n6 p685-688 Dec 78.

A role for nurse clinicians in urologic oncology is proposed. The increased use of chemotherapy in advanced genitourinary cancer has compounded the psychological and physical problems faced by the patients and their families. Chemotherapy necessitates a greater amount of physician/patient contact, much of which is assumed by nurse clinicians. It is suggested that traditional nursing values should be incorporated into the medical education of nurse clinicians so that they can provide support to the patients in dealing with the emotional and social impacts of cancer and chemotherapy. In order to establish the roles and responsibilities of nurse clinicians, State educational requirements and legal factors must be considered. The nurse and physician must then agree on a set of functions which complement those of the physician and a plan of therapy. The nurse clinician can aid in answering numerous patients' questions once confidence in his/her skill has been established, and can participate as a cotherapist in group counseling sessions for the patient's family. Initial histories and examinations, ordering of tests, administration of drugs, telephone consultations, and home visits are among the functions that a nurse clinician can perform in urologic oncology.

HRP-0029696/2 Not Available NTIS
Kaiser-Permanente Medical Center, Oakland, CA.
Role of Nurse Practitioners in Hypertension Care.
Krikor Soghikian. 1978, 4p
Pub. in Clinical Science and Molecular Medicine v55 n4, suppl p345-348 1978.

The effectiveness of hypertension care and management rendered by nurse practitioners was compared to that of physicians. Of all the patients contacting a California prepaid group practice, 102 were assigned to physicians, and 123 were assigned to nurse practitioners. Physicians treated their patients according to standard practice while nurse practitioners treated their patients in a hypertension clinic and followed a protocol of therapeutic procedures under a physician's supervision. At a 2-year followup the patients were compared with regard to diastolic blood pressure reduction, utilization and costs of medical services, and satisfaction with care received. Patients treated by nurse practitioners expressed a high level of satisfaction with their care. No significant differences were found in diastolic blood pressure between the two groups. The total cost of patient care was higher for the nurse practitioner group due to a higher frequency of visits made to the clinic, although the cost per visit was lower. It is concluded that nurse practitioners provide high quality care for hypertension patients.

HRP-0029698/8 Not Available NTIS
West of Scotland Health Boards, Glasgow. Dept. of Clinical Physics and Bioengineering.
Symbiosis -- Nursing and the Bioengineer.
J. M. Lenihan, and June C. Abbey. 1978, 7p
Pub. in Nursing Clinics of North America v13 n4 p589-595 Dec 78.

The development of a symbiotic relationship between bioengineering and nursing is described. The growth in technology and its application to patient care is summarized. With the increasing application of technological devices to medical care, nurses are increasingly expected to monitor the functioning of machines, and yet they are often not consulted before equipment is purchased, or instructed in its use. It is asserted that nurses should gain knowledge of technical instrumentation, the language of bioinstrumentation, and electrical safety, and that they should be involved in the selection and appraisal of technical equipment. The nurse's perspective as the health professional most often in direct contact with the patient can provide a balance between technology and humanity and aid in the development of noninvasive technology. Research is needed in the areas of nursing duties in regard to technology, the involvement of nurses in planning for and management of new technology, and the exposure of nurses to technology during their education. The importance of knowledge exchange between nurses and bioengineers is emphasized. While bioengineers work from an ideal model, nurses face the practical implications of technology on a daily basis. Thus, nurses can provide knowledge of the limitations on the actual use of equipment, and of unforeseen problems in its design.

HRP-0029814/1 Not Available NTIS
Association of Health Care Consumers, Inc., Chicago, IL.
Consumer Issues Around Health Systems Agencies (HSA's). A Report on Health Care Consumer Organizing in Illinois -- The Association of Health Care Consumers.
Frank Giarrizzo, and Dan Daley. 1977, 6p
Pub. in the Health Law Project Library Bulletin n338 p18-23 Dec 77.

The Association for Health Care Consumers (AHCC) is a Chicago-based consumer organization that hopes to be able to organize consumers and present their viewpoints in the same way that professional organizations effectively present the viewpoints of physicians and hospital administrators. Founded in 1976, AHCC has the following objectives: to be a catalyst for information exchange and cooperative action for consumers' and citizens' organizations addressing health issues; to promote consumer participation in Health Systems Agencies (HSA's) and other health-related Government agencies; and to focus on the issues of cost containment and equitable distribution of health care resources through education and action programs. AHCC has already had several encounters with the health professionals. In late 1976, the association lobbied against a proposed rate increase by Blue Cross/Blue Shield. The result was a smaller rate increase than had been requested. Blue Cross has been ordered to negotiate a new contract with the hospitals to build in some Blue Cross accountability for rising hospital costs. The association is also frequently asked to provide testimony to several HSA's and to the State Department of Public Health.

HRP-0029884/4 Not Available NTIS
Boston Coll., Chestnut Hill, MA. School of Nursing.
How to Increase Clinical Learning Opportunities in a Psychiatric Nursing Setting.
Karen A. Noonan. 1979, 11p
Pub. in the Jnl. of Nursing Education v18 n4 p5-15 Apr 79.

Ways in which the clinical experience of psychiatric nursing students can be enhanced are considered, with particular attention given to student-faculty role models, problemsolving, collaboration, and faculty-staff relationships. Two methods are useful in helping students become aware of their values: individual supervision, and exposure to various role models. Exposure to practitioners also helps students identify and solidify their value systems, and one way to facilitate positive identification with nurses is to assign a small group of students to a staff nurse who meets with them for 15 to 30 minutes weekly. It is imperative that students learn and master the process of problemsolving. This encompasses delineating the ideal versus the real. Collaboration involves supervision between students and instructors and is expanded by peer groups and interdisciplinary groups. To provide students with a full range of learning opportunities, faculty members and agency staff members must be oriented to the student experience and students must be oriented to the agency. The atmosphere in the agency for learning can either enhance or hinder students' opportunities for learning. The establishment of a positive and mutual relationship between faculty and staff facilitates the willingness of staff to spend time with students and to assist them in the learning process.

HRP-0029885/1 Not Available NTIS
Pennsylvania Univ., Philadelphia.
Implementing a Performance Evaluation System.
Dorothy del Bueno. 1979, 3p
Pub. in Supervisor Nurse v10 n2 p48, 51-52 Feb 79.

Essential elements in the process of performance evaluation are detailed. Performance evaluation is viewed as a continual process based on a carefully articulated set of elements. Such elements include content, tools and forms, training, a reward system, and an accountability system. What is to be evaluated constitutes the content element of performance evaluation. Tools and forms represent the format in which expectations are identified. The training element deals with the need for managers to learn procedures involved in conducting an evaluation session, the establishment of goals and action steps with employees, and the derivation of appropriate methods of coaching employees. Both material and intrinsic rewards comprise a reward system, and an accountability system reinforces employees' responsibilities to meet job performance expectations. Managers do not have the right to expect employees to change their personalities, but employees can be required to change their behavior in order to meet job expectations. An objective performance evaluation technique is described in which individual performance is evaluated rather than personality.

HRP-0029886/9 Not Available NTIS
Southern Arizona Mental Health Center, Tucson.
Interfacing the Role of a Psychiatric Clinical Nurse Specialist With a Hospital Emergency Room Setting.
Anne Forhan Andrianos, and Carol R. Swain. 1979, 4p
Pub. in the Jnl. of Psychiatric Nursing and Mental Health Services v17 n4 p24-27 Apr 79.

Responsibilities and activities of a psychiatric/mental health nurse specialist functioning in a hospital setting, specifically in the emergency room, are reviewed. The position established for the

nurse requires a high degree of competency in assessment skills and crisis intervention techniques, and knowledge of community and other support systems to provide quality direct patient care. Five duties were included in the original position description: (1) assesses and treats psychiatric patients in the emergency room by exercising independent judgment in case disposition; (2) coordinates psychiatric admissions and makes referrals to the hospital unit or to other community agencies; (3) accepts referral calls and contacts from mental health agencies and physicians in the community and provides followup reports; (4) serves as a mental health nursing consultant to nursing and medical personnel in both the emergency room and the psychiatric outpatient clinic; and (5) may design, direct, and implement research and demonstration projects and may provide clinical supervision to students in various mental health professions or in the nursing field. The role has expanded to include other functions, such as primary therapist, carrying a small outpatient caseload, maintaining communication and rapport with community agencies by participating in case coordination conferences, and consulting and providing inservice education for nursing personnel. Six general functions of a clinical specialist are noted. They include being a collaborative member of the health care team, a role model, a teacher, a change agent, a consultant, and a researcher.

HRP-0029887/7 Not Available NTIS
Carle Foundation Hospital, Urbana, IL.
Making Primary Nursing Work.
Roxane Spitzer. 1979, 3p
Pub. in Supervisor Nurse v10 n1 p12-14 Jan 79.

Primary nursing is examined in terms of direction, hiring and firing personnel, and motivation through evaluation. Whether primary nursing is called comprehensive patient care, holistic nursing, or total patient care, the important factor is true commitment. The effective implementation of primary nursing requires a nursing service director who believes in the ability of professional staff members. In hiring or firing personnel, a key consideration is whether an individual's philosophy is patient-oriented. Self-motivation and assertiveness are beneficial, but a subordinate personality is not. Participative management concepts should guide the participation of nursing care coordinators in hiring and firing, and a format and interviewing technique should be employed when an individual is considered for promotion or transfer to another position. Employee motivation is critical to the success of primary nursing. Motivation can be facilitated by written performance appraisals that are carried out in an organized and objective manner. Instead of always being a routine personnel department function, these appraisals should be used to provide praise and positive criticism and to outline goals and objectives in areas where employees need to improve. Since primary nursing cannot succeed in the traditional hierarchical structure, it must have a support system for professional practice and a system to develop the potential of each individual providing direct patient care.

HRP-0029888/5 Not Available NTIS
Liberty Mutual Insurance Co., North Haven, CT.
Management of Toxic Agents in the Workplace -- The Role of the Occupational Health Nurse.
Elisabeth M. Bodnar. 1979, 4p
Presented at a seminar cosponsored by the Connecticut Association of Occupational Health Nurses and the Connecticut Safety Society, Meriden, CT, Nov 18, 1978.
Pub. in Occupational Health Nursing v27 n3 p7-8, 11-12 Mar 79.

Preventive medical programing for occupational diseases and functions of occupational health nurses in managing toxic agents in the work environment are explored. Full-time occupational health physicians are rare; occupational health nurses must often assume a leading role. When necessary, they can initiate the process of determining whether medical surveillance measures must be implemented. Other factors requiring careful attention for evaluation are the amount of material present in the environment, the size of the workplace, the amount and type of ventilation, the proximity of employees to toxic agents, and job suitability or contraindication. Occupational health nurses must be aware of workers with preexisting conditions which can be aggravated by any exposure, synergistic effects when two or more agents act on the body, and additive effects of multisolvent exposures. There is considerable emphasis on threshold limit values, pregnancy and occupational exposures, and the evaluation of toxic agents with regard to management and safety. Occupational health nurses must collaborate with supervisory and safety personnel. Three goals are identified: (1) to measure the effect of toxic agents on the health of employees who may have been exposed; (2) to identify particularly susceptible persons who may exhibit effects at or below the threshold limit value; and (3) to determine vulnerability and/or effectiveness of engineering and administrative controls.

HRP-0029889/3 Not Available NTIS
Proposal, 1985: There Has to Be a Better Way.
Anthony A. Lee. 1979, 8p
Pub. in RN v42 n2 p39-46 Feb 79.

The negative response of nurses to the American Nurses' Association's (ANA's) position paper proposing a professional-technical division in nursing is discussed. If the proposal is adopted, a baccalaureate degree will be required for entry into professional practice. Nurses in general believe that such a requirement should not be imposed. Entry into the technical level of nursing will require 2 years of preparation, but nurses oppose the position paper in their belief that technical education should be provided in the hospital setting. The most frequently cited alternative to the ANA proposal is to drop it and instead upgrade nursing care. The next most popular alternative is to create a career ladder that will allow entry at any level and provide opportunities for upward mobility via various educational credit and experience options. The third most popular alternative calls for standardizing educational programs to combine the best of hospital and baccalaureate nursing programs. The liberal utilization of continuing education is also high in the ranking of alternative ways to upgrade the profession. Particular concern is indicated for the role of licensed practical nurses in the structure of nursing and for different sets of values held by nurses (both personal and professional). Comments and experiences of individual nurses in response to the ANA proposal are reported.

HRP-0030019/4 Not Available NTIS
Philadelphia Coll. of Pharmacy and Science, PA.
Effectiveness of Drug Product Selection Legislation in Delaware.
Joseph L. Fink, and Maven J. Myers. 1978, 5p
Pub. in Contemporary Pharmacy Practice v1 n1 p4-8 Summer 1978.

Pre- and postlegislation costs of twelve common drugs were followed in thirty randomly selected Delaware pharmacies. Under the revised antisubstitution laws, prescribers designate each prescription as either (1) to be dispensed with the particular brand indicated, or (2) open to generic substitution at the pharmacist's discretion. Study results revealed that the Delaware Drug Product Selection Act held unit prices for 10 of the drugs studied at a stable level, while the Consumer Price Index for prescriptions rose 7.04 percent. Substitution of generic drugs for 7 of the drugs studied resulted in significant savings for consumers. Approximately 40 percent of the multiple-source drugs reviewed were designated as open to substitution, and pharmacists substituted 56.2 percent of the time. Five tables and one figure illustrating substitutions are included.

HRP-0030168/9 Not Available NTIS
National Health Law Program, Los Angeles, CA.
Implementation of the Rural Health Clinic Services Act of 1977 -- Keepin' 'Em Down on the Farm.
Sara Rosenbaum. 1979, 11p
Pub. in the Health Law Project Library Bulletin v4 n142 p142-152 May 79.

The Rural Health Clinic Services Act of 1977 is reviewed, and its progress after passage is examined. The new category of services -- rural health clinic services -- which was created by the act, is considered. The certification of facilities is examined. RHC services are reimbursable only if they are provided by certified rural health clinics. A discussion of DHEW's certification criteria is provided. The clinic must be situated in a rural health shortage area and must comply with all local and State laws relating to licensure of medical facilities. In addition, a physician's assistant or nurse practitioner must be employed by the clinic on at least a 60-percent-time basis. All health personnel at the clinic must be certified or licensed to provide services under the appropriate State law. The use of physician extenders is examined. State limitations on implementation of the act are noted. State resistance to implementing the act is considered. The need for a uniform medical practice law is stressed. The Federal Government would then be able to design health programs which make the best use of available health personnel.

HRP-0030300/8 Not Available NTIS
California Univ., Los Angeles. Neuropsychiatric Inst.
Primary Nursing -- A Model for Individualized Care. 2nd Edition.
Gwen Marram, Margaret W. Barrett, and Em Olivia Bevis. 1979, 216p
Prepared in cooperation with San Joaquin Community Hospital, Bakersfield, CA.
Available from C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

Primary nursing is explored in terms of its advantages over other nursing systems, its operation, and its impact on patients, physicians, and nursing staff. Also considered are technological and professional trends that make this approach to nursing the most logical means of providing care. The discussion opens with a review of the evolution of modes of organizing the nursing care of patients, with attention given to factors affecting health care delivery. The nature and scope of primary nursing are then addressed. Specifically discussed are the operations of primary nursing units; a model primary nursing unit; features that enhance coordination, continuity, and patient-centeredness in primary nursing; and the process of change required for such innovation. Finally, the effects of primary nursing discovered through research are considered, with attention to outcomes for patients, the impact on nursing personnel, and the attitudes of physicians and administrators. Also included are various questions and answers related to primary care that arose in consultation sessions with administrators, physicians, and staff nurses. Lists of suggested readings are included.

HRP-0030301/6 Not Available NTIS
Nassau Community Coll., Garden City, NY. Dept. of Nursing.
Planning and Implementing Nursing Intervention -- Stress and Adaptation Applied to Patient Care. 2nd Edition.
Dolores F. Saxton, and Patricia A. Hyland. 1979, 195p
Available from the C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

This text is designed to assist students in planning and implementing nursing interventions based on recognition of physiological and psychological adaptations to stress as exhibited by patients. Six principles are paramount in developing a scientific approach to nursing intervention: (1) the process of living creates certain biological, physiological, and psychological pressures; (2) since persons constantly act and react in accordance with life situations as total organisms, adaptive responses required by one part of the organism will evoke responses in other parts; (3) adaptation may sometimes be detrimental and adaptation responses may require modification for overall well-being; (4) nurses have the opportunity to modify or alter patients' responses to the process of living; (5) patients demonstrate many common nursing needs; and (6) because nursing intervention is a scientific process, it must utilize a problemsolving approach in order to be planned and implemented effectively. Topics detailed in the text concern the concept of stress and adaptation, the nature of humans and society, adaptation responses and their use in the assessment of patients' needs, and theoretical concepts applicable to patient care situations (regulatory, motor-sensory, emotional, oxygen, nutritional, elimination, and fluid and electrolyte problems). Abbreviations used in the text are listed in an appendix. A glossary and a bibliography are included.

HRP-0030338/8 Not Available NTIS
Wayne State Univ. Coll. of Nursing, Detroit, MI.

Attitudes of Nursing Personnel Toward Death and Dying -- I. Linguistic Indicators of Avoidance.
Darlene W. Mood, and Barbara A. Lakin. 1979, 8p
Pub. in Research in Nursing and Health v2 p53-60 1979.

The use of linguistic indicators for determining attitudes of nursing personnel toward death and dying was tested. It was hypothesized that avoidance would be indicated by the substitution of a pronoun for negatively affected nouns. The literature regarding the analysis of linguistic patterns is reviewed. Transcripts of 21 interviews with registered nurses, licensed practical nurses, and nursing assistants were analyzed for noun and pronoun usage in reference to descriptions of physical and emotional supportive care and the reactions of patients and subjects to death and dying. A second study using transcripts of 19 additional interviews and the 21 original transcripts was conducted in order to analyze use of the work 'it' as a substitute for death related nouns. General pronoun usage was found to be related to the construct of avoidance, but was also affected by whether the referent was the patient or the nurse. Clarification of the relationship between pronoun usage and avoidance is required. The findings concerning the pronoun 'it' supported the hypothesis. It is suggested that other linguistic variables would be amenable to examination. The potential clinical implications of the findings are discussed. If practitioners are made aware of linguistic indicators of fear and avoidance, they can become more sensitive to patients' attitudes and detect defense mechanisms regardless of the speaker's overt denials of fear.

HRP-0030339/6 Not Available NTIS
Viterbo Coll., La Crosse, WI.
Communication Blocks Revisited.
Mary James Ramaekers. 1979, 3p
Pub. in American Jnl. of Nursing v79 n6 p1079-1081 Jun 79.

Ways in which communication between nurses and patients can be blocked are described. The nurse/patient relationship is defined as a means to further the personal development of the patient. Poor interviewing techniques and high anxiety levels can interfere with communication in a way which denies satisfaction to the patient. Ineffective communication occurs when the nurse seeks stereotyped responses or agreement with her own perceptions and ignores cues which conflict with the desired responses. The techniques of reflection and clarification are illustrated. These methods provide leads for the patient to discuss his problems. An example of a case in which the nurse missed the underlying themes of the patient's comments is presented. The patient consistently expressed concern about his helplessness through the use of sarcasm and the nurse failed to discuss or confront the issue. Another block to effective communication is excessive intellectualizing, moralizing, and advice-giving. In such cases, a nurse imposes her own solutions instead of helping the patient to arrive at his own. The use of cliches or irrelevant responses also serves to divert attention from the patient's concerns and shows a lack of interest in the patient. It is concluded that in order to encourage learning and personal growth, a nurse's responses should focus upon the needs and concerns of the patient.

HRP-0030340/4 Not Available NTIS
Yale Univ., New Haven, CT. School of Nursing.
Comprehensive Care for the Child With a Chronic Disability.
Beckett M. Rodgers. 1979, 3p
Pub. in American Jnl. of Nursing v79 n6 p1106-1108 Jun 79.

The functions of the pediatric nurse practitioner at the Yale New Haven Hospital spina bifida clinic are delineated. The importance of comprehensive care for the child with a chronic disability, including attention to psychosocial health and management in the context of the child's family and community is emphasized. The pediatric nurse practitioner's general functions involve direct patient contact, administrative responsibilities, and liaison activities. He/she teaches bowel and bladder regimens, conducts physical examinations, assesses the ability of parents and children to cope, assesses the child's development, and conducts group counseling for parents regarding chronic disease. The maintenance of continuity of care among the various service agencies is facilitated by visits to the home, school, and rehabilitation center. A comparison of care provided before and after the addition of the pediatric nurse practitioner was conducted. It was found that the patients' charts included more comprehensive data after the position was added. Improvement was also noted in bowel and bladder control and in the increase in short term hospital stays. Before the addition of the pediatric nurse practitioner, problems in the psychosocial adjustment of the patients and their parents tended to go unrecognized.

HRP-0030345/3 Not Available NTIS
Oklahoma State Univ., Stillwater. Coll. of Business Administration.
Factor Analysis of Attitudes of Rural Health Care Consumers Toward Nurse Practitioners.
William G. Zikmund, and Stephen J. Miller. 1979, 6p
Pub. in Research in Nursing and Health v2 p85-90 1979.

The attitudes of rural health care consumers toward nurse practitioners were investigated. A sample of 205 adults was derived from 10 Oklahoma communities with socioeconomic diversity and limited access to physicians. A Likert type attitude survey was administered by personal interview. Competency, interpersonal relations, and relative performance emerged as the factors which accounted for the greatest level of variance. Responses to the competency items revealed strong agreement with the contention that nurse practitioners are qualified to treat minor health problems. Uncertainty was expressed regarding the accuracy of diagnoses made by nurse practitioners. The respondents showed moderate agreement that the nurse practitioner would spend more time with patients and uncertainty regarding whether the nurse practitioner would show more personal interest than the physician. The responses to the factor of relative performance ranged from uncertainty to modest agreement. These results suggest that nurse practitioners' competency is generally accepted, but that their ability to correctly diagnose illness is doubted. The patient orientation and expressive function of the nurse practitioner was not as strongly perceived by the respondents as might have been expected. Lack of knowledge about physicians may have contributed to the uncertainty expressed regarding relative performance. The findings indicate areas in which education would be appropriate to insure consumers' acceptance of nurse practitioners as primary caregivers.

HRP-0030377/6 Not Available NTIS
Johns Hopkins Medical Institutions, Baltimore, MD. Health Services Research and Development Center.
Hospital Emergency Department Surveillance System -- A Data Base for Patient Care, Management, Research and Teaching.
Anne L. Kaszuba, and Geoffrey Gibson. 1977, 4p
Contract PHS-HS-01907
Pub. in Jnl. of the American College of Emergency Physicians v6 n7 p304-307 Jul 77.

The Johns Hopkins Health Services Research and Development Center and Emergency Department have developed a surveillance method that will enable the department not only to predict patient demand, but to prepare to meet that demand, and to measure performance. The surveillance study collects data on 10 percent of all emergency department visits. Data are collected in three phases. First, demographic and process data are recorded via the hospital's encounter form. The second phase of data collection is to abstract nursing process data. The third phase is to interview patients (10 percent of the study sample) by telephone 2 weeks after discharge. In the telephone interview, the patient is questioned about the frequency of symptoms, the intensity of symptoms, the degree of activity limitation, and the amount of anxiety caused by the condition. The patient is asked to evaluate those conditions at the time of his visit to the emergency department, at the time of discharge, and at the time of the telephone interview. The data are used to generate three monthly statistical reports to be used by the administration, by the teaching staff, and by the research staff. Three charts show the specific types of information collected.

HRP-0030384/2 Not Available NTIS
Restructuring the Health Service.
Tom Heller. 1978, 114p
Available from Croom Helm Ltd., 2-10 St. John's Rd., London SW11, England.

Britain's National Health Service is discussed in terms of some of its problems and their effects on the community at large. Recommendations for restructuring the service are included. Two decision-making groups within the health service are criticized: the administration/management and the medical profession. The analysis indicates: that there is a real deficiency in standards and availability of ordinary services of all types in many geographical areas; that the caring services are fragmented, making it difficult for those who need them to understand or apply for the range of services they might use; that preventive services are underfinanced, underresearched, and underdeveloped; and that persons with certain kinds of illnesses, such as psychiatric problems, receive a less-than-adequate standard of service. It is concluded that these and other distortions cannot be eliminated until the relationships of power within the service are changed in such a way that the community has a real voice in the service provided.

HRP-0030394/1 Not Available NTIS
Wisconsin Univ.-La Crosse. School of Health, Physical Education and Recreation.
Policies and Procedures of a Cardiac Rehabilitation Program -- Immediate to Long-Term Care.
Philip K. Wilson, Edward R. Winga, Joseph W. Edgett, and Thomas T. Gushiken. 1978, 253p
Available from Lea and Febiger, 600 S. Washington Square, Philadelphia, PA 19106.

Policies and procedures that have proven effective in operating the Cardiac Rehabilitation Program of La Crosse, Wis., are presented. A major objective of the La Crosse program is to provide an opportunity for cardiac patients and persons considered prone to coronary heart disease to participate in a scientifically and medically sound exercise program. The discussion opens with a brief review of the historical background of the program and the program's aims. Subsequent material focuses on: administrative concerns (e.g., patient fees and patient referral and acceptance criteria); the staff; the different phases of the program; graded exercise testing; exercise session material and procedures; and cardiopulmonary resuscitation and patient education materials. The remainder of the text is devoted to illustrative materials, e.g., a patient flow chart, delinquent fee letters, and a welcome letter. A bibliography and material on sources of patient education materials, graded exercise test protocols, equipment and supply companies, and other information pertinent to a cardiac rehabilitation program are appended.

HRP-0030395/8 Not Available NTIS
Johns Hopkins Univ., Baltimore, MD.
Social Security and Medicine in the U.S.S.R. -- A Marxist Critique.
Vicente Navarro. 1977, 149p
Available from D. C. Heath and Co., 125 Spring St., Lexington Book Div., Lexington, MA 02173.

A historical description and an analysis of the social security and health sectors in the Soviet Union are presented. The opening material discusses pre-Soviet Russia in terms of the evolution of social security, the health services, and the conceptualization of medicine. Subsequent material focuses on the periods of War Communism (1917-21), of the New Economic Policy (1921-28), and of industrialization (1928-53). The remaining discussions deal with post-Stalinism, the present structure of the Soviet health sector and the health labor force, and the rationale for and nature of State intervention in the health sector. Attention is given to the characteristics of the process of decisionmaking and planning and to regulatory machinery. The method of historical analysis used is one of historical materialism. This approach views change as the result of the interaction between objective forces such as material conditions in different periods, and subjective forces, such as the

prevalent ideology of the dominant group. The discussion concludes with a look at possible alternatives to the present nature of the Soviet State and Soviet medicine. A bibliography is included.

HRP-0030457/6 Not Available NTIS
Law and the Mental Health Professions -- Friction at the Interface.
Walter E. Barton, and Charlotte J. Sanborn.
1978, 330p
Available from International Universities Press, Inc., 239 Park Ave. S., New York, NY 10003.

Material from a 1976 conference concerned with some substantive aspects of psychiatric procedure frequently seen as actionable (confidentiality, informed consent, malpractice, tort liability, and due process) is presented. Essays in the opening section pertain to recent court decisions and practice. The broad issues addressed are the consequences of substituting legal process for medical judgment, and personal freedom versus treatment for mental illness. Among the topics touched on in the remaining papers are psychiatric malpractice insurance, alternatives to litigation, issues involved in Arizona's attempts to implement a new civil commitment statute, and an approach to mental health statutes that has the potential for becoming a model for future legislative reform. Other subjects explored are the origins of the right to privacy as a concept; the development of the 'need to know' as it pertains to psychiatric patients; the use of a business contract to define the physician-patient relationship; and the individual's right to freedom, autonomy, and personal choice versus the physician's duty to heal.

HRP-0030459/2 Not Available NTIS
Hospice -- Creating New Models of Care for the Terminally Ill.
Parker Rossman. 1977, 238p
Available from Association Press, 291 Broadway, New York, NY 10007.

The hospice movement is discussed in terms of its origins, the programs and institutional settings associated with it, the roles of various health team members, and legal and financial difficulties. The book is intended mainly for the use of persons interested in establishing hospice-type institutions or programs in their communities, although it will also be of interest to clergy, social workers, health professionals, and other persons charged with planning and funding social services. Among the specific topics addressed are the origins, development, operation, and problems of the New Haven-Branford Hospice in Connecticut; the hospice movement in England; the history of the care of the terminally ill; the needs and rights of dying patients; the dying patient's relationship with nurses and physicians; home care; and the problems faced by the family, including the difficulties of home care, the need for counseling and information, and the aftereffects of a family member's death. Suggestions for further reading accompany the text.

HRP-0030460/0 Not Available NTIS
Industry and Health Maintenance Organizations (HMO's) -- A National Alliance.
Richard H. Egdahl, and Diana Chapman Walsh.
1978, 117p
Industry and Health Care 5.
Available from Springer-Verlag New York, Inc., 175 Fifth Ave., New York, NY 10010.

The subject of this monograph is the state of health maintenance organization (HMO) development and the possible role of industry in this development. The book first extracts discussions held with corporate persons looking at HMO sponsorship and attempts to construct a composite picture of the situation in industrial firms across the United States. Subsequent material examines the major HMO types, using case descriptions; explores basic concepts and an approach for assessing alternative models in the context of the community resources available to the company; considers legal hurdles and what is needed to deal with them; and identifies issues for the future. For industry, these issues relate to the yardsticks to be used in assessing HMO sponsorship, the level of investment warranted, and the kinds of expectations that are reasonable. The issue for national health policy is how to define and allocate 'savings' that can be achieved through promotion of HMO's. Material on the Government's support and encouragement of HMO's and on issues raised by the application of the Bay State Health Care Foundation for a license to operate as an HMO is appended.

HRP-0030462/6 Not Available NTIS
Risk Management for Hospitals -- A Practical Approach.
Bernard L. Brown. 1979, 186p
Available from Aspen Systems Corp., 20010 Century Blvd., Germantown, Md 20767.

One aspect of hospital administration -- risk management -- is evaluated in terms of its purpose, objectives, requirements, organization, and means. The book is directed primarily to institutions that are considering the incorporation of risk management functions, although some of the material will also be of value to hospitals with an active program. Risk management is intended to eliminate problems that have the potential for resulting in harm to the organization, its staff, and its public. Ths discussion covers: the prerequisites for an effective risk management program; the risk manager's role; the structuring of the program; policies and procedures; the risk management team; and steps associated with the handling of potential liability problems. Attention is also given to program justification and feasibility, to philosophical aspects of a risk management program, and to self-insurance. Case studies designed to show a risk management program in action, an example of the way a safety and loss control council might be organized, an example of a self-insurance plan and of a trustee agreement, and a selected bibliography are appended.

HRP-0030508/6 Not Available NTIS
Patient-Oriented Ward Organization.
J. van Eindhoven. 1979, 3p
Pub. in International Nursing Review v26 n3 p86-88 May-Jun 79.

A patient-oriented plan for ward organization, which is being tested in the Netherlands, is described. The plan's components are: the assignment of one nurse to each patient for the duration of his hospitalization; a team of several nurses caring for a given patient throughout hospitalization; a horizontal system of organization which allows the primary nurse the necessary authority for clinical decisions; and communication among all individuals responsible for a patient's care. The principal nurse is responsible for planning of care from admission through discharge, helps with the admission procedure, explains institutional policy, assesses the patient's condition, gives care during his/her shift, explains who will be giving care when he/she leaves, maintains contact with the patient's family, and meets with the patient daily to evaluate care. Reports on care planning are submitted to the head nurse, who is responsible for coordinating care. Each nurse works with two student nurses, each of whom must serve a 2-year apprenticeship before being made fully responsible for patients. Increased autonomy for nurses and increased continuity of care for patients are viewed as the primary features of the patient-oriented system.

HRP-0030556/5 Not Available NTIS
Medical School, Birmingham (England).
Comparison of Rhys Hearn Method of Determining Nursing Staff Requirements With the Aberdeen Formula.
C. Rhys Hearn. 1979, 9p
Pub. in International Jnl. of Nursing Studies v16 n1 p95-103 1979.

This article compares nursing workload calculations made during trials on geriatric wards with the aid of the Rhys Hearn method based on the concept of ideal care, and the Aberdeen formula, involving the observation of care for several wards. In calculations involving the Rhys Hearn method, nurses in charge of wards were requested to prescribe direct care for all patients, with direct care defined as nursing care directly related to needs of individual patients. Indirect care, constituting all other work of nurses, was determined by observations in geriatric wards and expressed in hours per patient per day. Staffing requirements for wards in the Rhys Hearn study were calculated from prescriptions of direct care and measured event times weighted according to dependency factors or individual characteristics of patients. The indirect care workload was then added. Workload calculations were based on three skill levels (basic, skilled, and technical). Skilled and technical levels of the Rhys Hearn method were viewed as equivalent to the Aberdeen technical category. The way in which the equivalent of Aberdeen dependency factors calculated from the Rhys Hearn study vary between minimum and optimum prescribed standards of care was determined. Differences in ascertaining nursing staff requirements with the two techniques were due to two factors: (1) changes in policies for nursing geriatric patients; and (2) differences in standards of care. Supporting data and equations used in the calculations are provided.

HRP-0030578/9 Not Available NTIS
Help for the Head Nurse -- A Management Guide.
Joan Watson Ganong, and Warren L. Ganong.
1978, 88p
Available from W. L. Ganong Co., Homestead House, P.O. Box 2727, Chapel Hill, NC 27514.

Guidelines for the implementation of management techniques by head nurses are presented. The purpose of the manual is to make the role of head nurses more rewarding, and this is most likely to happen when head nurses know what is expected of them, have necessary clinical and leadership skills to perform their jobs, and have confidence in themselves that results from satisfactory on-the-job performance. Because the nursing profession has changed, nurses must personally decide how they respond to change, participate in change, and provide leadership in change. It is envisioned that guidelines will enable learners to identify performance responsibilities of head nurses as managers, utilize leadership skills associated with the head nurse role, interpret human needs of self and others as a basis for motivation, apply management functions and techniques on patient care units, and participate effectively as a nurse manager member of the health care team. Exercises, discussion sheets, references, illustrations, and information on management techniques are included, focusing on understanding the job of the head nurse with regard to management, major performance responsibilities, management functions, management skills and techniques, the management-employee environment, and management followthrough.

HRP-0030620/9 Not Available NTIS
Environment, Technology, and Health - Human Ecology in Historical Perspective.
Merril Eisenbud. 1978, 384p
Available from the New York Univ. Press, Washington Square, New York, NY 10003.

The purpose of this book is to explore the contemporary environmental movement as it relates to public health. Material in the first section explains what the environmental movement is and examines the preindustrial centuries, the Industrial Revolution, and environmental policy in the 20th century. Subsequent material examines population growth, food, energy, raw materials, and environmental issues that have attracted much attention, such as environmental cancer, nuclear power, organic chemicals, lead and mercury, and long-range atmospheric effects of pollution. Finally, an overall appraisal of the environmental movement and human health is presented. One of the successes of the modern environmental movement is that unprecedented support for environmental protection has developed. Failures include the fact that priorities have become disordered and illogical decisions have been made. The result is that many persons who first welcomed the environmental movement, particularly scientists, physicians, and engineers already working in the field of environmental health, have become disheartened. Drawings and photographs are included.

HRP-0030629/0 Not Available NTIS
King Edward's Hospital Fund for London (England).
Asian Patients in Hospital and at Home.
Alix Henley. 1979, 195p
Available from King's Fund Publishing Office, 126 Albert St., London NW1 7NF, England.

The customs, beliefs, and attitudes of Asian citizens in Great Britain are explored with a view toward increasing the understanding of health workers about Asian patients and thus improving the health care provided. 'Asians' in this book refers to persons from the Indian subcontinent (India, Pakistan, and Bangladesh) and East Africa. The opening discussion provides information on the languages spoken by the emigrants and the areas in Britain where they first settled. Maps show the major emigration areas in the Indian subcontinent and in East Africa. Subsequent material focuses on Asian families (customs followed at home and problems faced by family members in adapting to life in Britain) and on religion. Also explored are: behavior and beliefs vis-a-vis illness; the special needs of Asian patients in British hospitals (e.g., the presence of someone who speaks the patient's language); working with the whole family during the home visit; attitudes and customs of Asians surrounding motherhood, pregnancy, birth, and family planning, and care provided in light of these factors; the naming systems used in Britain and in Asian countries and general rules for registering new patients; personal hygiene; and clothes. Finally, jewelry and makeup, food, the language barrier and ways of overcoming it, Asian languages, and interpreters are considered. A bibliography is included.

HRP-0030633/2 Not Available NTIS
Hospital Association of New York State, Inc., Albany. Task Force on Regulation.
Cost of Regulation.
1978, 83p
Available from the Hospital Association of New York State, 15 Computer Drive West, Albany, NY 12205.

Questionnaires dealing with major regulations and regulatory bodies in 34 areas of hospital operations were distributed to all acute care institutions in New York State as part of a study focusing on regulatory costs in the hospital industry. The study covers the year 1976. The findings indicate: that 25 percent of hospital costs are attributable to meeting Government regulatory requirements; that approximately 24 percent of all man-hours are spent on regulatory matters; that registered professional nurses spend 25 percent of their time on regulatory matters; and that approximately 115 million man-hours per year are needed to satisfy regulatory requirements. Only 3 of the 34 departments studied were found to devote less than 10 percent of their overall costs to regulatory compliance. Among the recommendations offered are that reimbursement rates should be adjusted to reflect additional costs incurred as a result of increased regulation and that New York State should provide an accounting of the costs it incurs in the regulation of hospitals. Information on the study methodology, recommendations for further research, and supporting data are provided.

HRP-0030634/0 Not Available NTIS
Economics of Medical Malpractice.
Simon Rottenberg. 1978, 293p
Available from the American Enterprise Institute for Public Policy Research, 1150 17th St., NW., Washington, DC 20036.

The papers in this book, all of which pertain to medical malpractice, were originally presented at a 1976 conference. As a whole, they address the issue of how society can design and administer rules, pricing, incentive arrangements and processes that will enable patients to receive the kind of care they want, that will result in the appropriate quantity of caution being exercised in its delivery, and that will achieve these objectives at the lowest possible social cost. The opening paper attempts to extrapolate principles from the economics of safety to the problems of malpractice. Subsequent contributions focus on such concerns as: medical malpractice as a problem in normative economics; the impact of malpractice suits against physicians on physicians' services; the impact of malpractice suits against physicians and hospitals on hospital services; the economic consequences of alternative methods of compensating attorneys; and the origins of and cure for the medical malpractice problems. Commentaries are included.

HRP-0030635/7 Not Available NTIS
Pittsburgh Univ., PA.
Health Care Capital -- Competition and Control.
Gordon K. MacLeod, and Mark Perlman. 1978, 411p
Contract PHS-HRA-230-75-0208
Proceedings of Capital Investment Conference, University of Pittsburgh, Graduate School of Public Health, Nov 19-21, 1976.
Available from Ballinger Publishing Co., 17 Dunster St., Harvard Square, Cambridge, MA 02138.

This book contains material from a 1976 conference intended to show the changing patterns of capital funding of the health care industry in the United States and to examine alternative patterns of capital formation. Among the specific topics covered are legislation affecting health care facilities capital financing since the 1940's; the need for future Federal policy initiatives that combine the positive elements of the free market with those of public regulation; the lack of effective legislation for dealing with various social goals and public policies relating to health care services; hospital-based group practice prepayment plans (including their general characteristics and capital requirements and financing); private corporate investment in the delivery of health services, with attention to policy areas for review (e.g., the problem of regulation and the rate of return for investor-owned hospitals); a survey on philanthropy as a source of capital; and the U.S. capital market and its relationship to the capital needs of the health care field. The final paper projects and evaluates the response of capital markets to future demands for debts and equity financing for health care facilities. Discussion papers and comments accompany each paper. Material pertaining to the future of American health care capital funding is appended.

HRP-0030636/5 Not Available NTIS
Providing for the Health Services.
Douglas Black, and G. P. Thomas. 1978, 166p
Proceedings of Section X (General) of the British Association for the Advancement of Science, 139th Annual Meeting, 1977.
Available from the British Association for the Advancement of Science, Croom Helm Ltd., 2-10 St. John's Road, London SW11, England.

Material from a 1977 conference with the theme 'investment in health' is presented. The opening address deals with the role of Britain's Department of Health and Social Security in sponsoring research in various areas and with problems faced in an era where the customer-contractor principle operates. The papers that follow touch on: the meanings of welfare and of efficiency and the argument that broader and more sophisticated views of welfare are beginning to be reflected in economic research in the area; counterarguments to those put forth by the critics of the National Health Service (NHS); the role of nurses and health visitors within the NHS and the education and training of these groups; the consumer's voice in the NHS; and the control of technology in the interests of health. Also considered are strategies that might be adopted on control of one environmental pollutant (lead), occupational cancer and its control, and the use and development of drugs in Britain.

HRP-0030637/3 Not Available NTIS
International Epidemiological Association, Southampton (England).
Basic Health Care in Developing Countries -- An Epidemiological Perspective.
Basil S. Hetzel. 1978, 186p
Available from Oxford Univ. Press, Inc., 200 Madison Ave., New York, NY 10016.

Basic health care in developing countries is explored in a handbook which derived from the work of a group jointly sponsored by the International Epidemiological Association and the Western Pacific Regional Office of the World Health Organization. The introductory essay indicates that there is a worldwide movement characterized by community initiatives. The essays that follow show the way that epidemiology can meet the challenge of health needs in developing countries. Attention is given to Papua New Guinea, the Philippines, India, the Democratic Republic of North Vietnam, and China. Among the specific topics addressed are: the training of China's 'barefoot doctors'; a model health village in China; the development of health care in the Philippines through the Department of Health; and the use of village-based health workers. Also included is material on training and on health information systems. Finally, an epidemiological perspective on aspects essential to the planning, programing, implementation, and evaluation of health care delivery at the peripheral level is presented. Photographs are included.

HRP-0030639/9 Not Available NTIS
Oak Ridge National Lab., TN.
Water Chlorination -- Environmental Impact and Health Effects. Volume II.
Robert L. Jolley, Hend Gorchev, and D. Heyward Hamilton. 1978, 909p
Proceedings of the Second Conference on the Environmental Impact of Water Chlorination in Gatlinburg, TN, Oct 31-Nov 4, 1977. See also Volume I, HRP-0030638.
Available from Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106.

A conference on environmental and health effects of water chlorination was convened in 1977: to improve communication between scientists and practitioners involved in studying the process and impact of water chlorination; to discuss pertinent research and developments; and to present data and conclusions emerging from the conference and note areas for further investigation. Areas of research on water chlorination and other forms of halogenation prominent in the 1970's were considered: (1) toxicity of active chlorine to aquatic life; (2) formation of chlorinated organic compounds in the process of chlorinating waste water effluent; (3) perdurability of chlorinated organic compounds in the environment and their accumulation in the food chain; and (4) formation of haloforms in the chlorination of drinking water. Sixty-six presentations addressed these research areas and other problems associated with water chlorination (primarily disinfection). Presentations are organized according to the headings of fresh water system and marine system chemistry, environmental effects in fresh water systems and marine systems, health effects, drinking water treatment, waste water treatment, cooling water treatment, industrial effluent, and regulations. Conference workshop summaries, a conference summary, and closing remarks are provided. References and an index are included.

HRP-0030717/3 Not Available NTIS
Health, Behavior and the Community -- An Ecological Perspective.
Ralph Catalano. 1979, 278p
Available from Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523.

Explanations used to guide in the control of illness and abnormal behavior and an ecological perspective on coordinating efforts of community service professions, including health care workers, are presented. The book, in dealing with health behavior and the community, is designed to assist students interested in public health, mental health, law, urban planning, public administration, social work, and other fields in forming collaborative relationships. The ecological perspective is based on the assumption that the human community is an intricate system of interdependencies analogous to the natural ecosystem. Particular attention is paid to the concept of social cost as related to health behavior, and it is demonstrated that health and behavioral effects of community change can be viewed as unaccounted costs. Ecological principles are applied to the identification of health and behavioral costs associated with community change. Various levels of intervention in ecological processes are discussed. Consideration is given to biological and economic aspects of psychological paradigms and the ecological perspective used to study behavior and to avoiding and/or minimizing human costs associated with change. References and name and subject indexes are included.

HRP-0030718/1 Not Available NTIS
Congressional Quarterly, Inc., Washington, DC.
Editorial Research Reports on National Health Issues.
Hoyt Gimlin. 1977, 207p
Available from Congressional Quarterly, Inc., 1414 22nd St., NW., Washington, DC 20037.

Articles dealing with health care issues of national concern are compiled in this document. Even if adequate health care is provided to all U.S. citi-

zens, health care problems will still remain. These problems, some of which involve external factors, concern health care costs, abortion politics, genetic research, occupational safety and health, antismoking campaigns, obesity and health, changes in drug policies, medical malpractice insurance, strategies for the control of cancer, and heart research. The contention is that health problems cannot always be confined to laboratories or hospitals; they affect political, financial, and medical realms. Specific consideration is given to health care cost inflation, health insurance and public policy development, national health insurance, hazards in the work environment, the development of worker protection laws, problems in occupational safety and health regulation enforcement, diet and the social environment, changing approaches to weight reduction, drug use, the impact of litigation on health care, cancer and the environment, debate over causes of heart disease, advances in the treatment of coronary problems, and directions in cardiovascular research. References, figures and tables, and an index are provided.

HRP-0030721/5 Not Available NTIS
California Univ., Los Angeles. School of Public Health.
Introduction to Public Health. 7th Edition.
Daniel M. Wilner, Rosabelle Price Walkley, and Edward J. O'Neill. 1978, 533p
Available from MacMillan Publishing Co., Inc., 866 Third Ave., New York, NY 10022.

The premise of this textbook on major issues in public health is that knowledge of the health care system will help students pursuing health careers place their jobs in better perspective. A framework for examining public health is presented that covers public health in the 1970's and projected trends in the 1980's, the organization of public health services, and health professionals in the work force. Medical care, mental health, and environmental health are addressed, with consideration given to organizational modes of delivering medical care, direct medical care provided by the Federal Government, health insurance (financing by public and private sectors, national health insurance, and workmen's compensation), quality assurance, the role of government in mental health, mental illness prevention, selected mental health problems (mental retardation, drug abuse, alcoholism, and suicide), health aspects of the environment (air and water quality, pesticides, solid and hazardous waste, noise, food sanitation, and accidents), and protective programs (consumer protection and protection in the work environment). Health status and the incidence of disease among population groups are assessed, and selected public health supportive services (research, education, laboratory services, nutrition services, and pharmacy services) are discussed. References, tables, illustrative materials, and an index are included.

HRP-0030729/8 Not Available NTIS
American Association for the Advancement of Science, Washington, DC.
Health Care -- Regulation, Economics, Ethics, Practice.
Philip H. Abelson. 1978, 258p AAAS-78-12
Available from American Association for the Advancement of Science, 1515 Massachusetts Ave., NW., Washington, DC 20005.

Progress has been made in the health sciences and in the delivery of care, but problems still persist. These problems concern health care costs, actual tools of medicine (operations, diagnostic procedures, and equipment), and inadequate public understanding of vital health matters. Advances have been made in the health sciences, and changes have occurred in the social context of medicine. One of the most significant shifts in the social arena is the interest in national health insurance. Topics of interest regarding the science base and the social context of health maintenance are: physicians and their autonomy, the quality of medical care, and the development and regulation of new medications; evaluation of medical practice, defensive medicine, health care economics, and Federal health spending; nutrition, population growth, cognitive ability in deprived children, immunization, life events and stress and illness, and care of the elderly; computer use, research, cancer survival, surgical innovation, genetics and medicine, advances in medical instrumentation, behavioral neurochemistry, metabolic diseases of the nervous system, and medical treatment of mental illness; and ethics. Tabular data, illustrations, and an index are included.

HRP-0901587/6 Not Available NTIS
Health and Welfare Canada, Ottawa (Ontario). Long Range Planning Branch.
Occupational Health in Canada -- Current Status.
Jun 77, 106p
Available from the Department of National Health and Welfare, Brook Claxton Building, Ottawa, Ontario 21A-K1A0K9.

Programs and activities directed toward the improvement of occupational health in Canada as of 1976 are assessed. With occupational health identified as a priority area by Federal and Provincial ministries of health in 1975, increased effort was necessary on a national basis to explore occupational health as a major area of health promotion and illness prevention. Occupational health is described in terms of three components: factors affecting health (influences); health programs and activities; and health effects (impact). Health factors include psychosocial hazards and physical hazards. The programs and activities of the Government relate to liaison functions, jurisdictional roles, national non-Government organizations, the workmen's compensation system, occupational health data, information sources and system development, and employee health services. It is concluded that working conditions and the quality of working life in Canada have substantially improved, reflecting concerted efforts by the Government, professionals, management, and labor. Legislation has dealt with safety protection and education, occupational health services, and workmen's compensation. The need for further initiatives in planning for occupational health is stressed. Supporting data are tabulated. The appendixes provide information on Federal and Provincial roles in occupational health and safety.

HRP-0901592/6 Not Available NTIS
Health and Welfare Canada, Ottawa (Ontario). Long Range Planning Branch.
Premature Mortality Attributable to Smoking and Hazardous Drinking in Canada. Volume I. Summary rept.,
B. L. Ouellet, J. M. Romeder, and J. M. Lance.
Nov 77, 29p
See also Volume II, HRP-0901598.
Available from the Department of National Health and Welfare, Brook Claxton Building, Ottawa, Ontario 21A-K1A0K9.

This report summarizes the results of a study whose purpose was: (1) to demonstrate a specific application of a framework designed to enable health planners to rank, in terms of priority, health risk factors; and (2) to explore the extent of premature mortality in Canada attributable to two risk factors -- smoking and hazardous drinking. Steps necessary in determining premature mortality attributable to a single known risk factor, are: (1) review all causes of death appearing in the International Classification of Diseases; (2) determine the relative contribution of the risk factor for each cause of death; (3) calculate for each cause of death the actual amount of premature mortality attributable to the risk factor; and (4) calculate the total share of premature mortality due to a single risk factor by summing the separate contributions from each of the individual causes. Epidemiological data, prevalence estimates for smoking and alcohol consumption, and mortality data are used to assess the relative risks imposed by smoking and hazardous drinking. Particular attention is given to: lung cancer; cancer of the oral cavity and the pharynx, larynx, and esophagus; chronic bronchitis and emphysema; ischemic heart disease; cerebrovascular diseases; cirrhosis of the liver; motor vehicle accidents; accidental falls and fires; and alcoholism and alcoholic psychosis. Supporting data and selected references are included.

HRP-0901596/7 Not Available NTIS
Ontario Council of Health, Toronto.
Planning Function of District Health Councils.
1977, 35p
Available from the Ontario Council of Health, 700 Bay Street, Toronto, Ontario.

This report to the Ontario Council of Health in Canada deals with health planning, the planning process, relationships inside and outside the health care system, and resources. Health planning is examined in the context of district health council (DHC) functions. These councils are an attempt to involve nonprofessionals and health care providers in the decisionmaking process at the grass roots level. A distinction is made between operational planning (1 to 5 years), comprehensive planning (up to 10 years), and strategic planning (10 to 25 years). The planning process entails the determination of needs, the development of a sound data base and procedures for the interpretation of data, the establishment of priorities and options, assurance of the quality of services, and implementation of educational aspects of health planning. DHC's have a constitutional base but interpret health guidelines in various ways. The councils have representatives from health professions, health agencies, health science centers, and the Canadian Ministry of Health; coordination among councils and the sharing of available specialized services are crucial. Important entities outside the health care system related to DHC's include health-related agencies, the community, and local representatives of Government agencies. Necessary resources pertain to monitoring, need and demand data, health status data, health service data, manpower, health science centers, and financing. Additional information on functions of DHC's is appended.

HRP-0901598/3 Not Available NTIS
Health and Welfare Canada, Ottawa (Ontario). Long Range Planning Branch.
Premature Mortality Attributable to Smoking and Hazardous Drinking in Canada. Volume II. Detailed Calculations.
B. L. Ouellet, J. M. Romeder, and J. M. Lance.
Mar 78, 178p
See Also Volume I, HRP-0901592.
Available from the Department of National Health and Welfare, Brook Claxton Building, Ottawa, Ontario 21A-K1A0K9.

Methodological aspects of a project to determine premature mortality associated with smoking and alcohol consumption in Canada are described, and extensive data are presented. A mathematical approach to observing and calculating the two risk factors, smoking and alcohol consumption, illustrates the impact of the risk factors on health. More research, however, is needed with regard to multirisk factor effects, as well as more data on joint exposure to risk factors in the general population, to estimate the contribution of various risk factors to several causes of mortality. Data on the fraction of deaths and potential years of life lost between 1 and 70 years of age, attributed to smoking, are given for: lung cancer; cancer of the oral cavity and the pharynx, larynx, and esophagus; chronic bronchitis and emphysema; ischemic heart disease; and cerebrovascular disease. In addition, data on the fraction of deaths and potential years of life lost between 1 and 70 years of age, attributed to hazardous drinking, are provided for: cirrhosis of the liver; cancer of the oral cavity and the pharynx, larynx, and esophagus; motor vehicle accidents; and accidental falls and fires. References are cited.

HRP-0901599/1 Not Available NTIS
Health and Welfare Canada, Ottawa (Ontario). Long Range Planning Branch.
Dynamic Models of Health Care Systems.
Gerry B. Hill. Jan 77, 24p
Available from the Department of National Health and Welfare, Brook Claxton Building, Ottawa, Ontario 21A-K1A0K9.

Mathematical models to characterize the dynamic nature of the health care system are described. Open models mean that entry into, and exit from, the system is possible for at least one state. They contrast with closed models in which no immigration is possible. From a conceptual standpoint, it is possible to convert an open model into a closed model by postulating a further state, such as the outside world. The use of finite state models to describe the health care system has been recognized. In a deterministic model, the number of patients in particular states at a given time is treated as a real function of time. A distinction is made between continuous time and discrete time models.

whether they be deterministic or stochastic. Quantities in a discrete time model are usually equally spaced points in time, and this model leads to difference equations rather than differential equations. A mathematical solution of the deterministic model is detailed, and an example of the two-state model (renal dialysis and renal transplant) is given. A mathematical solution of the stochastic model is also provided. The use of models and simulation techniques to analyze the health care system is discussed. References are cited. Illustrations and equations are included.

N80-16724/0 PC **E03**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes Supplement 201.
Jan 80, 66p NASA-SP-7011(201)

This bibliography lists 191 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1979.

PB80-131857 PC **A13**/MF **A01**
Gulf South Research Inst., New Orleans, LA.
Development of a Fluorescent Caries-Disclosing Diagnostic System.
Final rept. 29 Jun 73-31 Dec 76,
H. Ralph Rawls, K. Q. Robert, Jr., J. C. LeDoux, E. E. Green, and E. L. Zimmerman, III. 2 Oct 78, 277p NIDR/CR-80-01
Contract N01-DE-3-2425
Proceedings of the Workshop Conference on Methods of Caries Prediction Held at Niagara Falls, New York on October 3-5, 1977.

A method for early diagnosis of incipient dental caries based on the permeation of lesions with fluorescent indicators was developed and tested. Three fluorescent caries-diagnostic formulations (CDF'S) were developed and tested. Artificial lesions were examined in ordinary light and under long-wave UV light. The responses of a panel of 5 observers were analyzed by statistical decision theory; utilizing a method which is independent of the observers' subjective judgments. The 3 CDF's substantially improved detection sensitivity at high levels of reliability. The most promising formulation, CDF 1, consists of surfactants, ethanol, fluorescent indicators, and flavoring agents. Animal studies were conducted to evaluate safety and probable efficacy. No pathological effects were observed at high dosage levels, nor were indications found that the CDF's cause irritation or sensitization. The results show that CDF solutions have a high potential for diagnosis of early caries. The technique does not appear to be hazardous for clinical use. Preparations were made to extend the study to in vivo evaluations of efficacy in animals and humans.

PB80-134091 Mag Tape $185.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Mortality Data, Cause-of-Death Summary, 1976.
Data file,
Harry Rosenberg. 1976, mag tape NCHS/DF-79/048
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-134109.

Vital statistics data relating to mortality provide demographic and cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex, and geographic area. Cause-of-death data have been coded to the underlying causes of death shown in the Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. The number of deaths and the death and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States, Volume II, Parts A and B. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-134109 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Mortality Data, Cause-of-Death Summary, 1976. Tape Contents and Documentation Package.
1976, 57p NCHS/DF-79/048A
For system on magnetic tape, see PB80-134091.

Vital statistics data relating to mortality provide demographic and cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex, and geographic area. Cause-of-death data have been coded to the underlying causes of death shown in the Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. The number of deaths and the death and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States, Volume II, Parts A and B. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-134117 Mag Tape $125.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Mortality Data, Local Area Summary, 1976.
Data file,
Harry Rosenberg. 1976, mag tape NCHS/DF-79/057
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-134125.

Vital statistics data relating to mortality provide demographic and cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex, and geographic area. Cause-of-death data have been coded to the underlying cause of death shown in the Eighth Revision of the International Classification of Diseases which was adapted for use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. The number of deaths and the death and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States, Volume II, Parts A and B. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-134125 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Mortality Data, Local Area Summary, 1976. Tape Contents and Documentation Package.
1976, 70p NCHS/DF-79/057A
For system on magnetic tape, see PB80-134117.

Vital statistics data relating to mortality provide demographic and cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex, and geographic area. Cause-of-death data have been coded to the underlying causes of death shown in the Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. The number of deaths and the death and infant mortality rates for selected demographic and cause variables are published annually in Vital Statistics of the United States, Volume II, Parts A and B. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-134851 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Medical Education Financing: Issues and Options.
Research digest series rept. 22 Jun 77-30 Jun 78,
Jack Hadley. Oct 79, 31p DHEW/PUB/PHS-79-3261, NCHSR-79-110
Contract PHS-HRA-230-77-0007

The digest is a summary of the principal policy implications from Medical Education Financing: Policy Analyses and Options for the 1980s; a comprehensive policy analyses of options for financing both undergraduate and graduate medical education. Five general classes of options are evaluated: reimbursement reforms, loan programs, scholarship programs, institutional support, and nonfederal governmental programs. This report also provides background information on the structure, organization and financing of the medical education system; the National Health Service Corps; the history of federal legislation affecting medical education; and econometric studies of the relationship between physician's earnings and specialty and location decisions. The evaluations are based on thorough reviews of existing research and the application of theoretical and empirical analyses to new data. Implications for an overall policy strategy for medical education financing are offered.

PB80-137979 PC **A03**/MF **A01**
Mathematica Policy Research, Inc., Princeton, NJ.
Responses of Canadian Physicians to the Introduction of Universal Medical Care Insurance: The First Five Years in Quebec. NCHSR Research Digest Series.
Final rept. 27 Jun 75-1 Mar 78,
Charles Berry, J. Alan Brewsler, Philip J. Held, Barbara H. Kehrer, and Larry M. Manheim. Feb 80, 29p DHEW/PUB/PHS-80-3229, DHEW/PUB/PHS-80-3229
Contracts PHS-HRA-230-75-0166, PHS-HRA-230-75-0167
See also Volume 1, PB-286 032, and PB-294 466.

The objective of this study was to determine the effects of universal and comprehensive physician insurance on (a) physicians' location and practice mode and on (b) the organization and behavior of physicians' private practices. Claims files of the Quebec Health Insurance Board as well as other national and provincial data sources were used. In cooperation with the Federation of General Practitioners of Quebec, a telephone survey of a stratified random sample of the general practitioners in the province (1900) was conducted to obtain current data on their practices, such as wages for staff, physicians' hours spent in providing primary care, etc. Geographical units within the province were delineated in an effort to ascertain mobility

and location of physicians. Sixty-five of these medical market areas were defined. Economic models and appropriate statistical methods were used to analyze the data in relation to the physician supply, physician mobility, utilization of services and cost.

PB80-138068 PC **A04**/MF **A01**
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume III: Perspectives and Methodology,
P. O. Woolley, Jr., W. S. Hays, and D. L. Larson.
Jun 72, 63p DHEW/PUB/OS-72-33
Sponsored in part by Agency for International Development, Washington, DC. See also Volume 5, PB80-138076.

The monograph uses two perspectives in planning: sectoral and inter-sectoral. Sectoral planning attempts to use fully resource allocations within a given sector. In sectoral planning decision-makers often work with resources immediately under the control of a sector, for example, agriculture or health. However, this does not mean that all resources for successful project implementation are under the control of sectoral planners. Effective planning, therefore, requires the coordination of both sectoral and inter-sectoral planning. Delineating distinct spheres of planning is not an attempt to separate entities but to unify them so that plans can be made, evaluated and restructured according to the criteria.

PB80-138076 PC **A07**/MF **A01**
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume IV: The Philippines,
P. O. Woolley, Jr., C. A. Perry, L. J. Gangloff, and D. L. Larson. Jul 72, 143p DHEW/PUB/OS-72-34
Sponsored in part by Agency for International Development, Washington, DC. See also Volume 5, PB80-138084.

This country case-study attempts to identify problem areas in health and socio-economic development for the Philippines. Particular attention has been given to the definition of those problem areas influenced by or amenable to change by cooperation between the Philippine government and international assistance agencies. There has been no attempt to develop a specific plan for action but rather to find those areas in which planning might be helpful. This study is based upon the reasoning that there are unifying sociocultural forces that influence the operation of economy, the government, education, health care, etc. Disease, the negative manifestation of health, represents the way in which a population deals with the environment as much as it represents the presence of a disease causing agent. Hence comes the hypothesis that the Philippine society is a result of the concepts of limited good and mutual survival whereby they feel that to enjoy good fortune is necessarily to take it away from someone else. Many kinds of data have been used in this hypothesis, and they uniformly state or suggest this conclusion. This study is consequently not a comprehensive view of the health sector as such but is a survey of the various influences that combine to produce the conditions found in the health sector.

PB80-138084 PC **A04**/MF **A01**
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume V: El Salvador,
P. O. Woolley, Jr., C. A. Perry, and D. L. Larson. Oct 72, 61p DHEW/PUB/OS-72-35
Prepared in cooperation with Agency for International Development, Washington, DC. See also Volume 3, PB80-138068.

The study is a brief overview of the basic health situation in El Salvador. Because of time limitations and scarcity of data, it is a sector assessment rather than an indepth analysis. Certain key problems became obvious; the primary area is malnutrition. There seems to be no programs, either from the government or the assistance agencies, to alleviate this problem. However, the Ministry of Health has proposed to increase the vaccination program to combat the high morbidity and mortality from childhood diseases. Improvement of the nutritional status of the population would have additional benefit for the health and well-being of the population. Another key area is the availability of health services. Some form of health facility is available 85.6% of the people, yet over half of them are not permanently staffed. More sophisticated facilities, however, are fairly evenly distributed throughout the country. El Salvador has a good transportation system, there are not any obvious cultural barriers to seeking modern medical care, and yet the people die from lack of care. The third major problem is sanitation. There is much activity in this area, an encouraging sign. Poor sanitation is one of the basic underlying causes for a large percentage of diseases and until this problem is solved, El Salvador will continue to carry the burden of preventable sickness.

PB80-138340 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Implementation of a Quality Assurance Program for Ultrasound B-Scanners.
Final rept.,
Hector Lopez, and Stephen W. Smith. Oct 79, 36p DHEW/PUB/FDA-80-8100, FDA/BRH-80-41

The Bureau of Radiological Health is involved in several efforts concerning diagnostic ultrasound. These include the study of biological effects, instrumentation and product evaluation, compliance with Federal regulations, and education. The Division of Training and Medical Applications have been involved in a large number of activities associated with quality assurance in diagnostic x rays. There exists a large amount of information concerning ionizing radiation-producing equipment, both from industry and from scientific professional societies. Very little information, however, is readily available to ultrasound equipment operators concerning the need or the benefits of a quality assurance program. This manual is intended for the practitioner and operator of diagnostic ultrasound B-scanning equipment, and is designed to guide the user in analyzing and improving quality of information obtained.

PB80-138449 PC **A05**/MF **A01**
National Center for Health Services Research, Hyattsville, MD.
Effects of the 1974-75 Recession on Health Care for the Disadvantaged.
Rept. for 24 Jun 75-30 Sep 77.
Jan 80, 95p DHEW/PUB/PHS-79-3248, NCHSR-80-4

A summary of the findings from seven studies on the effect of the 1974-75 economic recession on the health care of the disadvantaged is presented. Specific subjects studied were: (1) public finance, (2) trends in facility use, (3) utilization, (4) use of community hospitals in Rhode Island, (5) access to ambulatory care, (6) and (7) two studies on the impact of rising unemployment on the loss of job-related health insurance coverage. See back-of-title page for information on the names of the contractors, and instructions for purchasing the full reports.

PB80-138654 PC **A07**/MF **A01**
AIA Research Corp., Washington, DC.
Emerging Trends in Health Care: Implications for the Built Environment, an Agenda for Research. Environmental Design Research, Problems and Needs.
Final rept.,
Susan Christie-Shaw. 14 Nov 78, 144p NSF/RA-780706
Grant NSF-OPA78-20997
Prepared in cooperation with Skidmore, Owings, and Merrill, Boston, MA.

The report provides an agenda for environmental design research (EDR) that responds to emerging trends in health care. An overview of these trends includes disease and hazard prevention, health promotion, quality assurance, and cost-containment. The implications of these trends for the built environment are discussed. A survey of EDR is presented--its domain, its methods, its practitioners, and its relation to design. Also presented is an indication of the potential of EDR to contribute to improvements in health and health care, and an agenda of the major areas in which research is needed. Several non-research needs that directly affect the quality of EDR results and their usefulness to practicing designers are clarified. The appendix includes a Veterans Administration hospital report which contains both a referenced overview of the effects of health care facilities on those who use them and an indexed, annotated bibliography of 263 related articles and books.

PB80-138811 PC **A11**/MF **A01**
General Accounting Office, Washington, DC. Health Resources Div.
Better Management and More Resources Needed to Strengthen Federal Efforts To Improve Pregnancy Outcome.
Report to the Congress.
21 Jan 80, 232p HRD-80-24

Federal programs have helped increase access to health care for many and have contributed much to the Nation's progress in preventing infant mortality. However, many persons, particularly those of low income, not only lack ready access to adequate health care but fail to effectively use services which are available. The Federal Government, principally HEW, has recognized these problems and has taken several steps to help resolve them. However, a more systematic approach should be developed and the structure or management of several programs should be improved. Improvements in the types, amounts, and distribution of health care and better coordination between the public and private health care sectors are also needed.

PB80-139108 PC **A04**/MF **A01**
Lyndon B. Johnson School of Public Affairs, Austin, TX.
On Deployment of Health Resources in Rural Valle del Cauca, Colombia.
Special project rept.
1977, 55p
Sponsored in part by Colombian Ministry of Public Health. Prepared in cooperation with Tennessee Univ. at Knoxville. Dept. of Civil Engineering, and Health Service of Valle del Cauca (Colombia).

The paper reports on data collection, problem formulation, analysis and conclusions of a joint Colombian-American Study to integrate the use of location analysis into rural health planning in Colombia. Local planners in Zarzal, Valle del Cauca used census data and common sense to determine good centers from which to recruit rural health workers and at which to base ambulances. Their task can be formulated as a maximal covering location problem and was solved with both a heuristic appropriate to the local computer system and integer programming. Location analysis found better centers for health workers than did the local planners, in the terms of reference of the planners themselves. The ambulance deployment study suggested advantages to modifying system management practices. A portion of the specific recommendations have been implemented in Zarzal. The covering techniques are being applied by planners in other areas of Colombia.

PB80-140296 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Ophthalmology Manpower: Utilization of Supplementary Personnel, United States - 1968.
Vital and health statistics series.
May 73, 56p VHS/SER-14-9, DHEW/PUB/HSM-73-1804
Library of Congress catalog card no. 73-600049.

The report presents statistics on the utilization of supplementary personnel by the clinical practitioner of ophthalmology in the United States in 1968, based on data collected by National Center for Health Statistics.

PB80-140304 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Inpatient Health Facilities as Reported From the 1976 MFI (Master Facility Inventory) Survey.
Vital and health statistics series.
Jun 72, 48p VHS/SER-14/4, DHEW/PUB/HSM-72-1065
Library of Congress catalog card no. 74-179934.

The report shows statistics about nursing homes, hospitals, and other kinds of inpatient health facili-

ties including numbers of institutions, beds, and employees, as well as types of ownership, geographic distributions, and comparisons with other surveys. The report is based on data collected during the period of July-September 1967.

PB80-140312 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Inpatient Health Facilities as Reported From the 1969 FMI (Master Facility Inventory) Survey.
Vital and health statistics series.
Dec 72, 69p VHS/SER-14-6, DHEW/PUB/HSM-73-1801
Library of Congress catalog card no. 72-600140.

The report presents statistics about nursing homes, hospitals, and other kinds of inpatient health facilities including numbers of institutions, beds, and employees, as well as types of ownership, geographic distribution, and comparisons with other surveys.

PB80-140379 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Cohort Mortality and Survivorship: United States Death-Registration States, 1900-1968.
Vital and health statistics series.
Nov 72, 44p VHS/SER-3/16, DHEW/PUB/HSM-73-1400
Library of Congress catalog card no. 71-179928.

The report shows an analysis of mortality rates by age, color, and sex of selected generations of 5-year birth cohorts born 1896-1900 through 1926-1930. The report compares cohort and period life table surviorship by single years of age, color, and sex for selected 5-year cohorts born 1899-1903 through 1928-1932.

PB80-140494 PC **A04**/MF **A01**
Cardiothoracic Inst., London (England). Dept. of Thoracic Medicine.
Histocompatibility Antigens and the Evolution of Hypersensitivity Lung Diseases.
Final rept. Jul 78-Dec 79,
M. Turner-Warwick. Dec 79, 60p NIH-N01-HR-62935-F
Contract N01-HR-6-2935
See also report dated 26 Jun 78, PB-283 749.

HLA family and population studies in asthma have shown no associations with disease subgroups, serum IgE or IgG subclasses. Family studies in sarcoidosis have shown no haplotype disease association, but a population study showed an increased frequency of B8 in those with spontaneous resolution of disease. Family and population studies of extrinsic allergic alveolitis have shown no associations. A preliminary population study of cryptogenic fibrosing alveolitis suggested an increased frequency of B8, but this was not confirmed by a second series, and DRW antigen frequencies were normal.

PB80-140551 PC **A07**/MF **A01**
Columbia Univ., New York. Dept. of Pediatrics.
Asthma Self-Management Project.
Annual rept. no. 2, Oct 78-Sep 79,
C. Feldman, and N. Freudenberg. Oct 79, 126p NIH-N01-HR-7-2973-2A
Contract N01-HR-7-2973
See also report dated Sep 78, PB-287 329.

This annual report describes the educational intervention and data analysis of the Asthma Self-Management Project, a health education project designed to teach self-care skills to families of asthmatic children.

PB80-142359 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Trends in 'Prematurity'--United States: 1950-67.
Vital and health statistics series.
Jan 72, 59p VHS/SER-3-15, DHEW/PUB/HSM-72-1030
Library of Congress catalog card no. 70-610274.

The report shows an analysis of the trend in live births registered in the United States, 1950-67 by weight at birth and period of gestation, including an assessment of the quality of the data. Other factors, such as age of mother, plurality, sex, and delivery in hospitals are included.

PB80-144157 PC **A04**/MF **A01**
Kentucky Univ., Lexington. Medical Center.
Gingival Disease of Microbial Origin - Unit Prototype.
Final rept.
Jun 78, 53p NLM-NMAC-80-01
Contract N01-LM-7-4700

This is a prototype unit, not intended to serve as a self-contained teaching instrument. Although its use by students as a guide or outline may be helpful, and, in fact, is recommended, it has been developed primarily for the instructor, to provide a flexible framework upon which the teacher may build his own course.

PB80-145592 PC **A02**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Amebiasis: Laboratory Diagnosis. Part I. Life Cycle of 'Entamoeba histolytica',
M. M. Brooke, Russell K. Carver, Dorothy Mae Melvin, Robert L. Reynolds, and Andrea D. Lawrence. 1976, 25p HEW/CDC/BL-76/0006, DHEW/PUB/CDC-77-8327-PT-1
See also Part 2, PB80-145600.
Also available in set of 3 reports PC E06, PB80-145584.

Study program designed for individual instruction. The lesson presents diagnostic characteristics of the various species of intestinal amoebae and the laboratory methods used for laboratory examinations.

PB80-145600 PC **A04**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Amebiasis: Laboratory Diagnosis. Part II. Identification of Intestinal Amebae,
M. M. Brooke, Russell K. Carver, Dorothy Mae Lawrence, Frances H. Porcher, and Theresa McDaniel. 1976, 67p HEW/CDC/BL-76/0007, DHEW/PUB/CDC-77-8327-PT-2
See also Part 1, PB80-145592, and Part 3, PB80-145618.
Also available in set of 3 reports PC E06, PB80-145584.

Study program designed for individual instruction. The lesson presents diagnostic characteristics of the various species of intestinal amoebae and the laboratory methods used for laboratory examinations.

PB80-145618 PC **A04**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Amebiasis: Laboratory Diagnosis. Part III. Laboratory Procedures,
M. M. Brooke, Russell K. Carver, Dorothy Mae Melvin, Robert L. Reynolds, and J. H. Harless. 1976, 66p HEW/CDC/BL-76/0008, DHEW/PUB/CDC-77-8327-PT-3
See also Part 2, PB80-145600.
Also available in set of 3 reports PC E06, PB80-145584.

Study program designed for individual instruction. The lesson presents diagnostic characteristics of the various species of intestinal amoeba and the laboratory methods used for laboratory examinations.

PB80-805559 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cigarette Smoking (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Elizabeth A. Harrison. Mar 80, 190p
Supersedes NTIS/PS-79/0114, NTIS/PS-78/0098, and NTIS/PS-77/0132.

The selected abstracts of research reports cover coronary artery disease, visual perception, air pollution, respiratory diseases, attitudes, and physiological effects as related to cigarette smoking. (This updated bibliography contains 183 abstracts, 28 of which are new entries to the previous edition.)

PB80-805575 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nystagmus (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Elizabeth A. Harrison. Mar 80, 247p
Supersedes NTIS/PS-79/0129, NTIS/PS-78/0118, and NTIS/PS-77/0144.

The selected abstracts of research reports cover vestibular apparatus, vibration, acceleration, motion sickness, and aviation medicine as related to nystagmus. (This updated bibliography contains 240 abstracts, 6 of which are new entries to the previous edition.)

PB80-936700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Respiratory Tract.
Cancergram CK15.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers all aspects of the etiology of cancer of the respiratory tract, including the lungs, bronchi, trachea, larynx, and nasopharynx. Also included are carcinogenesis studies involving the buccal cavity, salivary glands, and lips, when apparently related to inhalation of carcinogens. Areas covered include occurrence and presumptive cause of respiratory tract cancer in human populations, experimental induction and modification of respiratory tract carcinogenesis, and morphological, biochemical, and other biological phenomena associated with the induction, development, or modification of respiratory tract cancer. A special category deals with the relationship of tobacco and smoking to respiratory tract cancer. Tobacco-related carcinogenesis involving other organ sites is covered in other Cancergram series, such as CK17 on kidney and urinary tract carcinogenesis. Other abstracts dealing with the analysis and more general carcinogenic properties of tobacco and tobacco smoke are included in Cancergram CK13. Clinical diagnosis and treatment of lung cancer is covered in Cancergram CT08, and of head and neck cancer in Cancergram CT11.

PB80-937700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Acute and Chronic Leukemia: Diagnosis, Treatment.
Cancergram CT03.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers both acute and chronic leukemia in all of its forms (acute lymphocytic, acute monocytic, acute or sub-acute granulocytic, chronic granulocytic, chronic lymphocytic, chronic monocytic, plasma cell, stem cell, and hairy cell). Other neoplastic conditions of the reticuloendothelial system, lymphatic system, spleen, multiple myeloma, macroglobulinemia, and other monoclonal gammopathies are excluded, since they are covered by Cancergram series CT05 and CT13. This Cancergram includes abstracts concerning all clinical aspects of the disease, such as diagnosis and staging, supportive care, evaluation, and therapy. Animal models, tissue culture experiments, carcinogenesis, and other preclinical studies are generally excluded, except for those considered to have direct clinical relevance.

6F. Environmental Biology

AD-A079 978/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Absorption Capacity of Dust-Air Flow,
A. G. Blokh, and A. I. Nosovitskiy. 28 Sep 79, 21p Rept no. FTD-ID(RS)T-1353-79

Edited trans. of Teploenergetika (USSR) n8 p23-26 1955, by Robert Allen Potts.

No abstract available.

HRP-0030869/2 PC **A02**/MF **A01**
Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine.
Health Risk Appraisal: The Estimation of Risk,
Axel A. Goetz, Jean F. Duff, and James E. Bernstein. Nov 78, 25p
See also HRP-0030860.

Health risk appraisal in the occupational setting is defined as a method by which a probability statement is generated to describe an individual's chances of becoming ill or dying from certain diseases. The emphasis is on methodological and research issues related to health risk appraisal and the future development of risk estimation techniques. A general approach to risk assessment is outlined in which individual risk estimates are generated by modifying data on the average risk in a population according to the presence or absence of risk-related characteristics in an individual. A method for scaling risk factors is described, and problems associated with the derivaton of risk factors are discussed. Consideration is given to risk estimation versus diagnosis, mortality and morbidity data bases, and risk estimation and mental status. Guidelines for estimating risk factors are presented that concern prognostic characteristics, the derivation of risk factors, and the combining of independent risks. A bibliography is provided.

PB80-131378 PC **A02**
Louisiana State Univ., Baton Rouge.
Antifouling Marine Coatings and Their Long Term Environmental Impact.
Journal article,
Mary L. Good, V. H. Kulkarni, C. P. Monaghan, and J. F. Hoffman. c1979, 21p LSU-R-78-029, NOAA-79111306
Pub. in Proceedings of the Coastal Marsh and Estuary Management Symposium (3rd) Held at Baton Rouge, LA. on March 6-7, 1979, p19-35 1979.

The problem of marine fouling and corrosion of ship hulls and marine installations is well known and has been attacked by many research and development groups. The problem is particularly acute in south Louisiana where the brackish and salty water of the wetlands constitute one of the worst fouling areas in the world. The only practical solution to these fouling problems through the years has been the utilization of paints and coatings having antifoulant activity based on a toxic component. Currently the most successful systems appear to be those containing organotin toxicants. As these materials find ever increasing utility and application in the marine industry and in naval operations, their long-term environmental impact on harbors and shipyards will become more important. The assessment of this environmental insult to the wetlands areas of south Louisiana is dependent on our ability to quantify the release of toxicant to the biosphere and to follow the biochemical pathway of the toxicant from release to eventual degradation as innocuous inorganic tin. (Copyright (c) 1979, Louisiana State University.)

PB80-132012 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
An Institutional Plan for Developing National Standards with Special Reference to Environment, Safety, and Health,
Bruce W. Steiner. Sep 79, 42p NBS-MN-165
Library of Congress catalog card no. 79-600116.

The plan was commissioned to provide a framework for the development of all essential non-nuclear energy-related, environmental, safety, and health (ES&H) standards for the private sector to coincide with the commercialization of new energy technologies. The development of such standards in the United States is a subset of the development of technological standards. Such standards consist of two basic types: 'limit standards,' which establish system performance criteria and 'compliance measurement standards,' which establish methods for the demonstration of compliance with 'limit standards.' The system addressed in this report encompasses four basic elements: (1) Hazards, (2) Limit Standards, (3) Evidence of Compliance, and (4) Compliance Measurement Standards. The unabridged version of the standards development process contains 39 discrete steps, each of which consists of intermediate stages. These are described here in the context of ten essential standards management functions. Some essential components in a comprehensive system, such as the voluntary standards bodies, already exist. However, to carry out many of the other functions effectively, new organizations would be required. The operation of the entire process is described in terms of a hypothetical example.

PB80-134349 PC **A03**/MF **A01**
Duke Univ., Beaufort, NC. Marine Lab.
Kepone (Trade Name) Effects on Development of 'Callinectes sapidus' and 'Rhithropanopeus harrisii'.
Final scientific rept.,
Carolyn G. Bookhout, John D. Costlow, Jr., and Robert Monroe. Sep 79, 47p EPA-600/3-79-104
Grant EPA-R-803838
Prepared in cooperation with North Carolina State Univ., Raleigh.

Laboratory experiments were conducted to determine the effect of Kepone on the development of Callinectes sapidus from the time of hatching until the 1st crab stage was reached. For comparison, similar investigations were made to ascertain the effects of Kepone on larval development of Rhithropanopeus harrisii. Of the concentrations tested, 35, 50, 65 and 80 ppb Kepone were found to be sublethal and 95, 110 and 125 ppb Kepone were acutely toxic to R. harrisii larvae; whereas 0.1, 0.5 and 0.75 were sublethal and 1.0 ppb Kepone were acutely toxic to C. sapidus larvae.

PB80-137599 PC **A03**/MF **A01**
Nature Conservancy, Arlington, VA.
The West Virginia Heritage Trust Program--Alternatives for the Future: the Application of Heritage Data to the Planning Process.
Aug 79, 34p
Contract DI-14-16-0009-77-062

The West Virginia Department of Natural Resources and The Nature Conservancy initiated the West Virginia Heritage Trust Program in 1975 to: (1) Establish a statewide inventory of West Virginia's natural heritage; (2) Establish an information system to collect, manage, and disseminate this inventory information; (3) Help decision makers determine which areas are most worthy of protection; (4) Act to protect important natural areas. These inventories comprise plant and animal species, which are believed to be endangered. Abstracts are given which provide distribution and life history of these endangered species.

PB80-139793 PC **A10**/MF **A01**
Georgia Inst. of Tech., Atlanta. Environmental Resources Center.
Biological Basis for Assessing Impacts of Channel Modification: Invertebrate Production, Drift, and Fish Feeding in a Southeastern Blackwater River,
Arthur C. Benke, David M. Gillespie, Fred K. Parrish, Thomas C. Van Arsdall, Jr., and Robert J. Hunter. Sep 79, 204p ERC-06-79, W80-03078, OWRT-B-105-GA(1)

Invertebrate production dynamics in the Satilla River in Georgia were studied to determine the effect of channelization or other river alterations on animal diversity, productivity, and general river ecology. The 362 km blackwater river has a drainage basin of 9143 sq km with good to excellent water quality. Invertebrates were studied in three major habitats: Snags, submerged wooden substrates; the main channel, sandy benthic conditions; and the muddy benthic habitat of backwater areas. Samples were taken to determine the relative importance of the various invertebrate habitats. Results show that the snag habitat had the greatest species diversity, standing stock biomass, and total production. The removal of snag habitats and/or channelization of the river would cause a significant decline in animal diversity and productivity.

PB80-141278 PC **A03**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Assessment of Bacteria and Virus Emissions at a Refuse Derived Fuel Plant and Other Waste Handling Facilities.
Executive summary,
D. E. Fiscus, P. G. Gorman, M. R. Schrag, and L. J. Shannon. Aug 79, 46p EPA-600/8-79-010
Contract EPA-68-02-1871
See also report dated Aug 78, PB-288 513.

The report is an executive summary of results of a program to compare relative levels of selected airborne bacteria and viruses within and around various waste handling facilities. Facilities included were an incinerator, a waste transfer station, a wastewater treatment plant, a landfill, and the St. Louis Refuse Processing Plant. The work also tested the bacteria removal efficiency of a mobile fabric filter. The results showed that uncontrolled bacteria levels, both in-plant and at the properly line, are generally higher for the refuse processing plant than for the other facilities tested. The fabric filter significantly reduced the levels of bacteria in the dust emissions from the refuse plants' air density separator. This report is of interest to consulting engineers, planners, and government officials involved in resource recovery.

PB80-143274 PC **A03**/MF **A01**
Los Angeles County-Univ. of Southern California Medical Center.
A Biologic Indicator for Air Pollution,
Russell P. Sherwin. Sep 79, 35p EPA-600/1-79-038
Grants EPA-R-800881, EPA-R-804545

The report describes studies wherein guinea pigs and mice were exposed to low levels of nitrogen dioxide either continuously or on an intermittent schedule. The major objective was to develop highly sensitive discriminants involving correlations of structural and functional alterations. The two major test areas developed were the quantitative measurements of Type 2 cell populations and protein leakage within the lung. The increase in number and size of Type 2 pneumocytes with NO2 exposure is believed to represent a corresponding loss of Type 1 lung cells, and the protein leakage within the lung is in accord with the concept that the Type 1 cell is a critical barrier for fluid transport in the alveolar area. The authors suggest that their research data supports the hypothesis that to properly evaluate the possible health effects from air pollutants one must give attention to the subclinical cellular alterations that deplete the functional and structural reserves of organs which are the primary target for air pollutants.

PB80-145071 PC **A08**/MF **A01**
Cornell Univ., Ithaca, NY.
Alternatives for Reducing Insecticides on Cotton and Corn: Economic and Environmental Impact.
Final rept. Apr 75-Feb 77,
David Pimentel, Christine Shoemaker, Eddy L. LaDue, Robert B. Rovinsky, and Noel P. Russell. Aug 79, 159p EPA-600/5-79-007A
Grant EPA-R-802518-02

Insecticide levels and application costs supplied by 31 entomological experts, plus estimates of the other costs involved with various insect control strategies, indicate that many insect control strategies that may significantly reduce insecticide use on cotton and corn may be more economical than strategies currently being used. An analysis of alternative insect control technologies in corn revealed that few opportunities exist to employ alternative strategies because only about 1 pound of insectide is applied per acre. The prime pest on corn is the rootworm complex and the practical alternative is crop rotation. Several alternate controls are available for cotton that would reduce the use of large quantities of insecticide, however. A detailed static analysis revealed that selecting the most economical control strategy for cotton in each growing region resulted in an annual reduction in insect control costs of $81 million and also reduced total insecticide use by about 40%. A significant finding was that if cotton production could be allowed to shift naturally in the Nation, insecticide use and cotton production costs would be greatly reduced.

6H. Food

AD-A079 949/4 PC **A11/MF A01**
Army Natick Research and Development Command MA Food Engineering Lab
Entree Production Guides for Modified Diets at Walter Reed Army Medical Center. Part I. Consolidated Modified Meat Entrees.
Technical rept.,
C. P. Shaw, G. A. Darsch, G. L. Legris, Y. Masuoka, and J. M. Tuomy. Apr 79, 229p NATICK/FEL-91, NATICK-TR-79/010
See also Part 2, AD-A073 718.

Production guides suitable for cook/freeze hospital food service entrees for special diets have been developed. Included in this report are 19 entree production guides suitable for calorie restricted, Type II hyperlipoproteinmic (HLP) diabetic, bland diets, 9 entree production guides for sodium and/or calorie restricted, Type II HLP, diabetic bland diets, and 18 for sodium, restricted, calorie restricted, Type II HLP, diabetic bland diets. Also included are production guides for 5 sauces for calorie restricted, Type II HLP, diabetic bland diets, 3 for sodium and/or calorie restricted, Type II HLP diabetic, bland diets and 5 for sodium restricted calorie restricted, Type II HLP, diabetic bland diets. (Author)

AD-A079 958/5 PC **A04/MF A01**
Army Natick Research and Development Command MA Food Engineering Lab
Entree Production Guides for Modified Diets at Walter Reed Army Medical Center. Part IV. Meat Substitute Entrees.
Final rept.,
G. A. Darsch, R. G. Young, C. P. Shaw, and J. M. Tuomy. Jun 79, 72p NATICK/FEL-92, NATICK-TR-79/013
See also Part 3, AD-A069 183.

The production guides contained in this report consist of thirteen meat substitutes. The primary purpose of these items is to serve as entrees for patients, who as vegetarians or by religious doctrine require meatless products. Secondly, these entrees are available for patients who desire a meatless item as a variation in their normal diet. Presently, in the majority of hospital feeding systems, a patient desiring a product of this type must select from a limited meatless menu, trying to construct his own entree. However, with the development of the meat substitute as a separate entity, he now has this option readily available.

PAT-APPL-6-098 460 PC **A02/MF A01**
Department of Agriculture, Washington, DC.
Soda Crackers.
Patent Application,
Takashi F. Sugihara. Filed 29 Nov 79, 12p PB80-141427
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to and has among its objects the provision of novel methods and products for preparation of soda crackers. It is a particular object of the invention to substantially reduce the fermentation time of the dough or sponge in the process of preparing soda crackers.

PB80-130461 PC **A04/MF A01**
Science and Education Administration, Albany, CA. Western Regional Research Center.
Intact or Unit-Kernel Sweet Corn.
Technical rept. 1976-79,
G. H. Robertson, M. E. Lazar, D. F. Farkas, J. M. Krochta, and J. S. Hudson. Oct 79, 70p EPA-600/2-79-193
Grant EPA-R-804597

This report evaluates process and product modifications in canned and frozen sweet corn manufacture with the objective of reducing the total effluent produced in processing. In particular it evaluates the proposed replacement of process steps that yield cut or whole kernel corn with process steps that yield intact or unit kernel corn. When compared to a conventional cutting process with a yield of 40 to 33 parts per 100 parts of corn in husk, the processing of intact kernels resulted in corresponding waste reductions of 85% to 94% (based on chemical oxygen demand per pound of product) and yield increases of 5% to 26%. Sensory comparisons showed that regardless of the variety or method of preservation, intact kernel samples were preferred by a larger percentage of the panel (paired preference rating) than the cut controls.

PB80-920400 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Sections 1-6. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $225.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920499.

The standing order allows one to obtain updates to the Compliance Program Guidance Manual which was developed to provide a convenient and organized system for issuing and filling program plans and instructions directed to Food and Drug Administration Field operations. These plans and instructions are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations. The Manual is divided into six major categories as follows: Food and Cosmetics, Drugs, Biologics, Veterinary medicine, Medical devices, and Radiological Health.

PB80-920499 PC**$162.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Sections 1-6.
1980, 3950p FDA/ACA-80/28
Document includes 6 sections that are also available individually as PB80-920599, PB80-920699, PB80-920799, PB80-920899, PB80-920999, and PB80-921099. Updates to basic report available as PB80-920400.

The Compliance Program Guidance Manual was developed to provide a convenient and organized system for issuing and filing plans and instructions directed to Food and Drug Administration Field operations. These plans and instructions are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations. The Manual is divided into six major categories as follows: Food and cosmetics, Drugs, Biologics, Veterinary medicine, Medical devices, and Radiological health.

PB80-920500 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section I. Foods and Cosmetics. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $80.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920599.

The standing order allows one to obtain updates to Section I of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for foods and cosmetics. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920599 PC**$54.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section I. Foods and Cosmetics.
1980, 1051p FDA/ACA-80/28A
Updates to basic report available as PB80-920500. Complete manual available as PB80-920499. See also PB80-920699, PB80-920799, PB80-920899, PB80-920999, and PB80-921099.

Section I of the Compliance Program Guidance Manual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for food and cosmetics. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920699 PC**$68.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section II. Drugs.
1980, 1544p FDA/ACA-80/28B
Updates to basic report available as PB80-920600. Complete manual available as PB80-920499. See also PB80-920599, PB80-920799, PB80-920899, PB80-920999, and PB80-921099.

Section II of the Compliance Program Guidance Manual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for drugs. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920700 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section III. Biologics. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $32.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920799.

The standing order allows one to obtain updates to Section III of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for biological products. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920799 PC**$10.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section III. Biologics.
1980, 233p FDA/ACA-80/28C
Updates to basic report available as PB80-920700. Complete manual available as PB80-920499. See also PB80-920599, PB80-920699, PB80-920899, PB80-920999, and PB80-921099.

Section III of the Compliance Program Guidance Manual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for biological products. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

6J. Industrial (Occupational) Medicine

HRP-0030860/1 PC **A14/MF A01**
Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine.
National Conference on Health Promotion Programs in Occupational Settings Held at Dulles Marriott, Washington, DC. on January 17-19, 1979. State-of-the-Art Papers.
1979, 314p
See also HRP-0030861 thru HRP-0030871.

A national conference was convened in January 1979 to discuss the promotion of health in the occupational environment. Eleven state-of-the-art papers were presented. Topics included: alcohol and drug abuse and the establishment of occupational substance abuse programs covering such issues as constructive confrontation, self-help,

union involvement, relationships with the treatment community, education and public relations, and special populations (small businesses, women, youth, polydrug users, and insurance coverage); health behavior change, such as concepts, realities, problems, and opportunities; hypertension; weight control and nutrition; physical activity; health risk appraisal; self-protective measures; the elimination of smoking; stress management; industry and health promotion; and the role of unions in industrial health intervention programs. Figures, tables, references, and abstracts of each paper are included.

HRP-0030861/9 PC **A02**/MF **A01**
Cornell Univ. Medical Coll., New York.
Hypertension Control Programs in Occupational Settings,
Michael H. Alderman, Lawrence W. Green, and Brian S. Flynn. 1979, 20p
Prepared in cooperation with Johns Hopkins Univ., Baltimore, MD. Div. of Health Education. Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

Hypertension control programs in industry and patient education are addressed. It is estimated that cardiovascular disease and stroke accounted for $50 billion in direct and indirect costs in 1976, or 20 percent of all health-related expenditures. Hypertension is a major cause of cardiovascular disease and stroke and, of all cardiovascular risk factors, is the most responsive to available interventions. Detection, referral, and followup of hypertension in the occupational setting are embodied in such programs as the Chicago Heart Association project in Illinois, the Michigan worker health program, and the Burlington Industries program. Studies involving the occupationally-based treatment of hypertension indicate that a rigid therapeutic approach, reliance on a health team, the removal of personal financial impediments, emphasis on patient participation in the treatment process, and the provision of services within a socially cohesive facility are more important determinants of patient outcomes than the physical location of a treatment facility. Insurance companies have become interested in the development of programs to encourage blood pressure control activities in industry, including the Blue Cross Association with support from the National Heart, Lung, and Blood Institute. Benefits resulting from educational strategies in treatment settings pertain to increased health care provider contact time, increased number of health care provider contacts, active patient participation, social support, and self-monitoring of blood pressure. References are cited.

HRP-0030862/7 PC **A03**/MF **A01**
Baylor Coll. of Medicine, Houston, TX. Dept. of Medicine.
Weight Control and Nutrition Education Programs in Occupational Settings,
John P. Foreyt, Lynne W. Scott, and Antonio M. Gotto. 1979, 39p
Contract N01-HL-1-7269
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sport Medicine. See also HRP-0030860.

The occupational setting is viewed as a unique opportunity for implementing weight control and nutrition education programs. The basic premise underlying behavioral treatment programs is that dietary changes involve substantial changes in eating behavior. Some form of self-monitoring is employed in these programs, with self-control techniques consisting of two steps: observation of dietary behavior; and self-recording of behavior in a notebook. Self-monitoring is useful because it gives individuals and persons working with them a record of their dietary habits and because the act of writing down food intake appears to have a positive effect on the diet. After self-monitoring for a certain period, individuals should begin to recognize certain patterns in their diet. Stimulus control techniques are often helpful components of dietary treatment programs. In order for these techniques to be effective, individuals and persons working with treatment must be creative in designing the most appropriate procedures for the work setting and at home. Other ways of weight control are slowing the act of eating and contingency management techniques in which individuals are rewarded for changing their diet. Examples of weight control and nutrition education programs are detailed. Information on an appropriate diet and on the cost-effectiveness of weight control and nutrition education programs in industry is presented. Figures, tables, and references are included.

HRP-0030863/5 PC **A03**/MF **A01**
Yale Univ., New Haven, CT.
Stress Management in Occupational Settings,
Gary E. Schwartz. 1979, 30p
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

Various stress management procedures for use in the occupational setting are summarized, including relaxation, biofeedback, and psychological coping strategies. Most research linking stress to illness is not based on data derived from the occupational environment. The challenge facing industry, labor, and science is to design stress management programs that are clinically effective and cost-efficient. Development and integration are key concepts in stress management. The development of knowledge centers around the creative integration of behavioral and biomedical approaches. Major types of psychosocial stress facing workers include work overload or work stagnation; extreme ambiguity or rigidity in relation to tasks; extreme role conflict or little conflict; too much or too little responsibility; competition; constant change and daily variability or a routinized strategy; ongoing contact with so-called stress carriers, e.g., demanding supervisors, anxious persons, or indecisive individuals, versus social isolation; and interactions among career development, career opportunities, and management styles. One stress management procedue is assertiveness training. The goal here is to help people assert themselves more appropriately so as to reduce the likelihood that they will engage in health risk behaviors. In many instances, assertiveness training programs combine behavioral therapy, imagery, role playing, and other techniques to improve the ability to communicate. Relaxation, meditation, biofeedback, and guided imagery are geared toward helping persons cope with an environment that cannot be changed. Studies indicate that stress management programs in industry can be effective in both clinical and cost terms. A list of references is provided.

HRP-0030864/3 PC **A03**/MF **A01**
California Univ., Los Angeles. Div. of Behavioral Sciences and Health Education.
Smoking Cessation Programs in Occupational Settings: 'State of the Art' Report,
Brian G. Danaher. 15 Nov 78, 32p
Sponsored in part by Public Health Service, Washington, DC. Office of Helth Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

The growing interest of the business community in providing antismoking programs for employees is discussed. Research on smoking cessation methods demonstrates a number of promising directions that involve aversive smoking approaches combined with self-control strategies. Inexisting smoking cessation programs, there is some emphasis on physician counseling but relatively greater interest in the use of consultants or proprietary programs to encourage nonsmoking. Specific recommendations for business smoking cessation programs are to: (1) increase the integration of in-house smoking cessation programs utilizing a variety of antismoking strategies; (2) expand emphasis on behavioral skills training in addition to proprietary or incentive programs for smoking control; (3) improve research methodologies, including complete followup assessment and the use of chemical tests for validating self-reported abstinence; (4) give more attention to empirically tested attractive recruitment procedures to involve as many employees as possible in a cost-effective manner; and (5) promote interchange among behavioral scientists, health professionals in occupational health, union and employee groups, and management. Major trends in the literature on the modification of smoking behavior are reviewed. Specific examples of smoking control programs in the business setting are detailed. References are included.

HRP-0030865/0 PC **A03**/MF **A01**
Stanford Univ., CA. School of Medicine.
The Physical Activity Component of Health Promotion Programs in Occupational Settings,
William L. Haskell, and Steven N. Blair. Nov 78, 33p
Prepared in cooperation with South Caroliina Univ., Columbia. Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

The inclusion of exercise as an essential component of health promotion programs in the occupational setting is examined. Literature supports the notion of the beneficial effect of a physically active lifestyle. Benefits are primarily related to the performance of large muscle dynamic exercises; more vigorous forms of exercise seem to cause the greatest improvement in both physical working capacity and health. For both safety and effectiveness reasons, exercise programs must be individualized in terms of interests, needs, and capabilities. Guidelines are available for the design and implementation of appropriate exercise programs, and mechanisms exist for the provision of trained leadership necessary in the successful operation of these programs. Although little behavioral research has been conducted to determine what factors contribute to the effective initiation and maintenance of exercise programs by sedentary adults, available data indicate that factors influencing participation include effective program leadership, program convenience, support (peers and family), education and promotion, program variety and individualization, goal setting, evaluation, and recognition. Health benefits of exercise are evaluated with regard to coronary heart disease, weight control, psychological status, orthopedic limitations, and job performance. Significant funding support is needed to explore the impact of increased exercise on job performance in both government and private industrial settings. References are cited.

HRP-0030866/8 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Self-Protective Measures Against Workplace Hazards,
Alexander Cohen, Michael J. Smith, and W. Kent Anger. 1979, 29p
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

Techniques to influence individual worker behaviors, actions, and attitudes in ways that facilitate greater self-protection against workplace hazards are examined. Training and reinforcement represent directive-type means for targeting and strengthening specific worker actions. Critical considerations in this regard are the use of training and reinforcement approaches that emphasize the learning of safe or healthful behaviors as opposed to the unlearning of unsafe or harmful acts, conditions of practice that insure the transfer or learned behaviors to real situations, setting performance goals for actions and providing frequent feedback to mark progress, and the establishment of meaningful rewards with an adequate reinforcement schedule and delivery system. Nondirective-type approaches are intended to create attitudinal change, a state of heightened awareness, or other predispositions favorable to self-protective actions. The emphasis is on communication, incentive, and management style factors as they relate to appropriate change in the health and safety consciousness of workers. Fulfilling information needs about safety and self-protection through company incentives aimed at generating interest in job safety and health is discussed, and increased self-protection is noted as a possible byproduct of top management's commitment to and lead in job safety and health matters. Supporting evidence from field studies and technical literature on directive and nondirective techniques is reviewed, and recommendations pertinent to these techniques are offered. References are cited.

HRP-0030867/6 PC **A02**/MF **A01**
New York Telephone Co., NY.
Perspectives of Industry Regarding Health Promotion,
G. H. Collings, Jr. 1979, 16p

Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

Reasons for considering the work setting as a favorable area of investigation where health promotion programs can be successful are enumerated. Because efforts to produce substantial improvements in health within existing frameworks of government and the private health care system have not always been impressive, opportunities for health promotion in the workplace are being increasingly recognized. Five factors make the work environment attractive for health system purposes: (1) more people, particularly women, are in the work force than ever before; (2) despite increased job mobility, most people in the work force are very stable; (3) periodic acquisition of health data can be accomplished with relative ease; (4) workers are willing to participate in health programs offered in the work setting; and (5) the Occupational Safety and Health Act and related legislation at both Federal and State levels are rapidly extending the scope of health effects considered to be occupational in origin. The view is expressed that health promotion consists of two distinct but interrelated activities, wellness improvement and disease prevention. The prevalent tendency to explore the promotion of individual health components in isolation, such as hypertension and smoking cessation programs, is not viable. An integrated approach to health care management is recommended if health promotion is to be achieved and maintained on a cost-effective basis. The concept of risk identification, to reduce overall costs and to improve outcomes, is discussed.

HRP-0030868/4 PC **A02**/MF **A01**
California Univ., Berkeley. Inst. of Industrial Relations.
A Perspective of Health Intervention Programs in Industry,
M. Donald Whorton, and Morris E. Davis. 15 Dec 78, 19p
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. Prepared in cooperation with Environmental Health Associates, Inc., Berkeley, CA. See also HRP-0030860.

A perspective on health intervention programs and their relation to the industrial environment is presented. Four key issues must be addressed in health intervention programs: whether employees constitute a captive group of participants; whether there is subtle coercion that assures full participation and/or cooperation; whether health prevention programs in industry represent a plausible avenue to pursue with regard to preventive health; and whether preventive health programs are successful only in cases where there is group participation. Concern for worker health should be shared by both management and physicians, with physicians being neutral in labor and management matters. Literature indicates more negative feelings toward occupational physicians than toward occupational nurses, industrial hygienists, and safety engineers. It is essential that employees be encouraged to participate in health intervention programs and that these programs do not take the place of broad occupational health or environmental control programs. The screening of symptomatic versus asymptomatic patients, screening for hypertension, and testing for coronary artery disease and colon-rectal cancer are cited as areas of concern in health intervention programs. References are included.

HRP-0030870/0 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Health Behavior Change at the Worksite: A Problem-Oriented Analysis,
Joseph H. Chadwick. 1978, 29p
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

The work setting is viewed as a favorable environment for health promotion and outreach services. A systems approach to health behavior change is advocated that encompasses concepts, realities, problems, and opportunities. Principal elements of health behavior change systems in the occupational environment are policy and ethics, welfare functions, funding sources, interorganizational agreements, self-care, worksite care, conventional care, patient education, information systems, physician education, planning and evaluation and management. With regard to worksite care, some of the most important aspects include risk or health hazard assessment, communication to participants, behavioral assessment, risk status monitoring, behavioral status monitoring, risk reduction planning, and risk reduction actions or interventions. Planning and evaluation needs pertinent to health behavior change involve health effects of interventions, behavioral effects of intervention, operations and costs of implementing programs for health behavior change, and benefits resulting from given health effects (social utility and cash flow benefits).

HRP-0030871/8 PC **A03**/MF **A01**
Institute for Behavioral Research, Inc., Silver Spring, MD.
The Control of Alcohol and Drug Abuse in Industry,
Robert L. DuPont. 15 Nov 78, 47p
Sponsored in part by Public Health Service, Washington, DC. Office of Health Information, Health Promotion and Physical Fitness and Sports Medicine. See also HRP-0030860.

Problems resulting from the use of alcohol and other psychoactive drugs are discussed in terms of prevention, and the effectiveness of alcohol and drug abuse programs in the work environment is considered. Industrial substance abuse programs are increasing in number due to concern over the well-being of workers and the maintenance of productivity. Employed persons have lower rates of alcohol and drug problems than unemployed persons, but the extent of substance abuse problems in the work force is large. Occupational programs are based on constructive confrontation (involuntary) and self-help (voluntary) approaches. There are wide range of such programs, including the use of health insurance benefits, industry-based treatment programs, and referral from the work environment to community substance abuse treatment resources. The latter program is the most common. Further development of occupational programs should focus on research, prevention, unique needs of special groups (women, youth, and polydrug users), and the extension of services to both employees and their families. Since behavioral control issues have been raised by traditional substance abuse programs, it is necessary that joint union-management mechanisms in the occupational setting be developed. Particular attention must also be paid to relationships between the work environment and the treatment community and to education and public relations. References are cited.

PB80-129166 PC **A02**/MF **A01**
Southern Research Inst., Birmingham, AL.
Residual Monomers in Acrylic and Modacrylic Fibers and Fabrics.
Final rept.,
Joe M. Finkel, Ruby H. James, and Herbert C. Miller. Jul 79, 14p SORI-EAS-79-504, EPA-560/11-80-003
Contract EPA-68-01-4746

The report deals with the detection and quantitation of acrylonitrile, vinylidene chloride, and vinyl bromide, which are used as monomers in the production of acrylic and modacrylic fibers. The amounts of monomers evolved from samples of carpets, fibers, and fabrics at 50C and 50% relative humidity were determined by gas chromatography with a flame ionization detector and by direct insertion probe mass spectroscopy. The results of the gas chromatographic studies indicate that detectable amounts of residual acrylonitrile, vinylidene chloride, and vinyl bromide were not released from the carpet, fiber, and fiber samples under the conditions selected for analysis. Direct insertion mass spectrometry indicated that methyl bromide was evolved from all of the fiber samples and from two of the three carpet samples. From the remaining carpet sample, three halogenated compounds--dibromo-dichloroethanol, tetrabromoethanol, and tribromochloroethanol--were identified. Traces of fatty acids were found in all of the samples, and sulfur dioxide was evolved from all of the samples except the fabric sample.

PB80-130909 PC **A04**/MF **A01**
Clayson (Zoe), Baltimore, MD.
Correlation of Community and Family Contact Diseases with Single Source Industrial Emissions.
Final rept. Sep 78-Aug 79,
Zoe Clayson. Aug 79, 72p ASPER/PUR-78/4665/A

The objectives of this report are to assess the state of the art in community studies of airborne industrial pollutants and to identify industrial toxic substances causing pulmonary and respiratory diseases for the families of workers and other community members. Data are gathered from data banks, literature searches, interviews and the academic resources of the John Hopkins University. The principle findings were (1) Asbestos, lead and vinyl chloride are well documented causes of family and community disease. (2) There is little quantitative data on industrial emissions. (3) Better data is needed to resolve conflicting interpretations of the health impairments caused by such criteria pollutants as sulfur dioxide. (4) A zero effect level cannot be assumed for community exposures to industrial toxic substances; synergistic effects are difficult to establish and individual polluters have not been identified. (5) Although the acute effects of pollution have been studied in detail, only a few studies exist on chronic respiratory impairment, a major health effect of industrial emissions. (6) Mortality data are useful for correlation of cancer rates with monitoring information if chronological accuracy is maintained. (7) Morbidity data, which are the most useful in assessing chronic impairments, are not presently available in the form necessary for correlation with surveillance data. (8) Existing data banks attempting to correlate mortality data with monitoring data are inadequate. This analysis provides a general overview of the magnitude of the problem of industrial emissions and indicates areas for further research.

PB80-149032 PC **A09**/MF **A01**
Occupational Safety and Health Administration, Washington, DC.
Cancer Policy.
Final environmental impact statement.
Jan 80, 181p OSHA/IS-80/001

The document reviews a proposed policy for identification, classification and regulation of Toxic Substances posing a potential occupational carcinogenic risk. It covers the backgrounds of the proposed legislation, the health effects associated with exposure to carcinogens, describes the proposed legislation and its alternatives, and the projected environmental impacts. In addition to OSHA, the following federal agencies have a primary role in regulating chemical carcinogens: EPA, FDA, FSQS (Food Safety and Quality Service), DOT, CPSC, research institutes such as NCI, NIOSH, & NIEHS, and others.

PB80-804826 PC **N01**/MF **N01**
National Technical Information Srvice, Springfield, VA.
Occupational Health Services and Employee Health Programs (Citations from the NTIS Data Base).
Rept. for Sep 68-Feb 80,
Mary E. Young. Feb 80, 68p
Supersedes NTIS/PS-79/0127 and NTIS/PS-78/0160.

The selected abstracts of research reports related to occupational health services are concerned with the physical, mental, and social well-being of humans in relation to work and the working environment. Reports on health care programs for employees include health screening, immunization, drug treatment programs, the role of nurses, and health education. (This updated bibliography contains 61 abstracts, 13 of which are new entries to the previous edition.)

6K. Life Support

AD-A079 788/6 PC **A03**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Evaluation of the Diving Systems International Superlite 17B Helmet.
Test rept.,
James R. Middleton. Nov 79, 27p Rept no. NEDU-9-79

The Diving Systems International Superlite 17B helmet was tested by NEDU in accordance with MIL-R-24169A. Results of unmanned testing which evaluated breathing resistance, sideblock pressure drop and breathing work showed that the helmet meets or exceeds all mil spec requirements. The helmet is not recommended for inclusion on the list of equipment Authorized for Navy Use because the U.S.N. currently has no requirement for this type of equipment in addition to its own USN MK I Mod O Mask. (Author)

AD-A079 789/4 PC **A03**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Evaluation of the Boatman, Inc. Armet F.R.S. 1000 Helmet.
Test rept.,
James R. Middleton. Nov 79, 28p Rept no. NEDU-10-79

The Boatman, Inc. Armet F.R.S. 1000 helmet was tested by NEDU in accordance with MIL-R-24169A. Results of unmanned testing which evaluated breathing resistance, pressure drop out of the first stage regulator, and breathing work showed that the helmet meets or exceeds all mil spec requirements. The helmet is not recommended for inclusion on the list of equipment Authorized for Navy Use because the U.S.N. currently has no requirement for this type of equipment in addition to its own USN MK I Mod O Mask. (Author)

AD-B021 839/6 PC **A04**/MF **A01**
Honeywell Inc Minneapolis Minn Systems and Research Center
Development of a Fluidic Oxygen Regulator.
Final rept. Feb 75-Jul 76,
Frederick A. Moynihan. Jan 77, 75p 76SRC33, 77SRC10, AFFDL-TR-76-154
Contract F33615-75-C-3004
Distribution limitation now removed.

The object of this study was to build and test a breadboard of an automatic oxygen regulator using fluidic techniques. Goals set for the regulator were that it should have oxygen economy, be rugged, simple, and self-powered. Feasibility of controlling the oxygen enrichment following a specified cabin pressure schedule was demonstrated. Features of the mixture control circuit were a fluidic function generator, a fluidic pulse duration modulator and an ejector pump. Feasibility of controlling the output pressure for normal breathing and pressure breathing as a function of cabin pressure was demonstrated. Major components in the closed pressure control loop were a fluidic function generator, a fluidic comparator amplifier, and a fluidically driven mechanical shutoff valve.

N80-16738/0 PC **A05**/MF **A01**
General Technical Services, Inc., Upper Darby, PA.
Thermodynamic Considerations in the Support of Life for Long Space Voyages.
Final Report.
A. S. Iberall, and S. Z. Cardon. Nov 79, 89p NASA-CR-162755
Contract NASW-3240

The essential requirements for the maintenance of life, particularly human life, on isolated space missions of long duration were investigated through the study of extended irreversible thermodynamics. The characterization of a four trophic level system was developed. Questions of stability are discussed.

PAT-APPL-953 510 PC **A02**/MF **A01**
Department of the Navy Washington DC
Electronic Breathing Mixture Control.
Patent Application,
Jack L. Jenkins. Filed 23 Oct 79, 20p AD-D006 806/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electronic breathing mixture control system which senses and controls the oxygen component partial pressure of an underwater breathing mixture. Three oxygen sensors disposed within a mix chamber generate voltages proportional to the oxygen partial pressure in the mixture. These voltages are processed and compared with reference voltages using digital logic circuitry. The resulting processed signals control two light emitting diodes warning the user of improper oxygen partial pressure and in addition control a switch that actuates an oxygen valve which either restricts oxygen flow to the mix chamber or allows more oxygen to flow therein. (Author)

PB80-144686 PC **A10**/MF **A01**
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Microbial Processes: Promising Technologies for Developing Countries.
Final rept.
Feb 80, 215p CIR/BOSTID-80/28
Contract AID/csd-2584

Ten subpanels selected a number of microbial processes that met either of the following criteria: (1) The process can be beneficially employed in developing countries, or (2) The process has sufficient potential for developing countries to merit research and development for future use. Microbes can be marshaled to aid in solving many important global problems including food shortages, resource recovery and reuse, energy shortages, and pollution. Microbiology is particularly suited to make important contributions to human needs in developing countries, yet it has received comparatively little attention. The range of possible applications covers uses by individuals and industries in rural settings, villages and cities. The ten subject areas covered include raw materials for microbial processes, food and animal feed, soil microbes in plant health and nutrition, nitrogen fixation, microbial insect control agents, fuel and energy, waste treatment and utilization, cellulose conversion, antibiotics and vaccines, and pure cultures for microbial processes.

6L. Medical and Hospital Equipment

N80-16739/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL. Structures and Propulsion Lab.
Prosthetic Device for Correction of Urinary Incontinence.
R. Helms. Dec 79, 22p NASA-TM-78255

The development and current status of a prosthetic device for the correction of urinary incontinence is presented.

PAT-APPL-6-087 270 PC **A02**/MF **A01**
Department of the Navy Washington DC
Apparatus and Process for Determining the Composition of Fluid-Filled Cavities.
Patent Application,
Guillermo Gaunaurd, and Herbert M. Uberall.
Filed 22 Oct 79, 20p AD-D006 896/5
Availability: This government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes an apparatus and method for determining the material properties characterizing a fluid contained in a cavity inside a solid comprises analyzing the resonances in the amplitude of elastic waves scattered by the cavity. Specifically, the resonance positions and their widths are used to determine the sound speed and the density of the cavity filler. The sound speed is found from the spacing between two consecutive overtones of any mode, which asymptotically becomes uniform for the higher-index overtones. The density is obtained from the width of any high order resonance and accordingly, all the information about the material composition of the filler is contained, and can be extracted, from the high-frequency asymptotic region. (Author)

PB80-132020 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Properties and Interactions of Oral Structures and Restorative Materials.
Annual rept. 1 Oct 78-30 Sep 79,
James M. Cassel, J. A. Tesk, G. M. Brauer, J. M. Antonucci, and J. E. McKinney. Nov 79, 125p NBSIR-79-1943
Sponsored in part by National Inst. of Dental Research, Bethesda, MD. See also PB-289 913.

The objective of the research effort discussed briefly in the report is to effect improved dental health through development of new knowledge and better understanding of the mechanical, chemical and physical properties of materials used or potentially of use in restorative and preventive dental practices. The four major areas of research as approved in the interagency agreement are: Dental composite, resin and sealant chemistry and development; Development of adhesive bonding techniques; Wear resistance and mechanical properties of dental materials; and Dental alloy, ceramic and implant research. Promising new polymerization shrinkage-reducing dental resins that have been synthesized include prepolymer fluorinated polymethacrylate monomer; diurea dimethacrylate; and methacryloxyethyl-1-adamantylcarboxylate, a tri-cyclic saturated monofunctional monomer. Initial experiments to gain greater durability using a rubber toughening approach with BIS-GMA indicates a less brittle but tougher matrix can be achieved. Acetylthiourea and ascorbic acid have been shown to be promising non-amine type of accelerators for the BIS-GMA. Research to develop adhesive restorative materials indicates that urethane methacrylates with residual isocyanate groups yield less adhesion than is achievable with 2-cyanoacrylate esters. Dimensional change data that results from thermal cycling of different porcelains indicate considerable variation, some of which appears relatable to the crystalline forms that are present.

PB80-133846 PC **A03**/MF **A01**
Thermo Electron Corporation., Waltham, MA.
Fabrication of Implantable Artificial Heart Devices and Components.
Annual technical progress rept. Apr 78-Apr 79,
V. Poirier, and S. Buczak. May 79, 45p TE4143-217-79, NIH-NHLBI-71-2065-8
Contract N01-HV-1-2065
See also PB-282 799.

The report describes the fabrication activities conducted in support of NHLBI's Artificial Heart Program. The devices fabricated are used primarily by other NHLBI contractors conducting research and development in the artificial heart area. During the past year, axisymmetric blood pumps, pusher-plate blood pumps, pump control systems and mock circulatory loop components were fabricated and delivered as directed by the program office. In addition, a comprehensive, real time, endurance test of blood pump bladders was carried out. Two hundred-fourteen (214) bladders were tested in seven (7) materials and eight (8) geometries.

PB80-135155 PC **A07**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Development of Electrical Energy Converters to Power and Control Left Heart Assist Devices.
Annual technical rept. Nov 78-Jun 79,
V. Poirier, D. Gernes, W. Bernhard, W. Caly, and C. Sherman. Jun 79, 138p 4235-17-80, NIH-N01-HV-7-2976-2
Contract N01-HV-7-2976
See also report dated Jun 78, PB-288 159.

Development and evaluation of a low-speed torque motor energy converter (MK IV) was continued with major emphasis placed on increased reliability and computer-aided system characterization. In vitro component tests have demonstrated cam and diaphragm life in excess of two years with no failures to date. In vitro operation of the complete MK IV system has passed one year without failure or significant wear. Five calf studies were performed, the longest exceeding 100 days.

PB80-135510 PC **A15**/MF **A01**
Gould, Inc., Oxnard, CA. Medical Products Div.
Development of an Electrical Energy Convertor for Circulatory Devices.
Annual rept. 9 Jun 78-15 May 79,
J. A. Chambers, L. A. Davies, L. M. Mahler, and T. T. Yen. May 79, 341p NIH-N01-HV-8-2916-1
Contract N01-HV-8-2916
See also report dated Jun 78, PB-286 738.

Significant progress has been made improving ferro-fluid seals with 64 and 40 million cycles

achieved on motor shaft seals and actuation arm seals. Assembly of lubricant filled convertors to begin using these seals. Seal tests conducted with new seal testing unit and actuation pad tests to begin with 400 cycle per minute pad testing unit. Life tests achieved 80,056,800 and 63,640,400 cycles. Convertor components except bearings have achieved 152,073,600 and 123,720,000 cycles. In-vitro tests include lubrication corrosion of convertor housing, Mod. X pump bladder and influence inflow pressure on pump output. Failure analysis indicate techniques for achieving two year life expectancy. Improved and larger cam follower bearings designed and in fabrication by New Hampshire. Improved energy convertor motors received which achieved 61.64% efficiency in mid-physiologic range. Gould P-50 pressure transducer with flange used routinely in left ventricular pressure measurements. Extended in-vivo tests of 1,000 hours are providing definitive information on best synchronization logic by the use of extended testing of each logic change. Titanium housings for energy convertor completed for future in-vivo tests.

PB80-137714 PC **A10**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Development and Evaluation of Unilateral and Bilateral Cardiac Assist Devices.
Annual technical rept. Nov 75-Oct 76,
J. Keiser, W. Bernhard, V. Poirier, D. Gernes, and M. Szycher. Oct 76, 206p 4183-32-77, NIH-N01-HV-4-2910-3
Contract N01-HV-4-2910
See also report dated Jan 78, PB-284 090.

Development of a long-term left ventricular assist system has been undertaken in four major areas. The Model 11 LVAD has been analyzed and tested in vivo and in vitro. Xenograft valves and Tecoflex HR bladders have produced good results. In vivo studies have been conducted up to four months. Bladder materials evaluation has reduced eight candidate materials to the two most promising, Biomer and Tecoflex HR. Integrally textured rigid components have been studied and prototypes fabricated. Power metallurgy treated titanium appears most promising for metal components while electron discharge machined negatives and salt leaching appear most favorable for rigid plastics. Development of the torque motor actuator has continued and the Mk II system has been tested in vitro and in vivo with encouraging results. Recent improvements in cam design and brushless commutation show promise in eliminating component wear restrictions to longevity. Overall system efficiency has been maintained at 28% with the recent endurance improvements.

PB80-137722 PC **A10**/MF **A01**
Andros, Inc., Berkeley, CA.
An Electromechanical (Solenoid) Energy Converter and Control System for a Clinical Left Ventricular Assist System.
Annual rept. 1 Jun 77-31 May 78,
Peer M. Portner, Jal S. Jassawalla,, Philip E. Oyer, Phillip J. Miller, and Kurt W. Skytte. Jun 78, 206p NIH-N01-HV-4-2914-5
Contract N01-HV-4-2914
Prepared in cooperation with Stanford Univ. Medical Center, CA. Dept. of Cardiovascular Surgery.

Development of the first systems-designed Left Ventricular Assist System (LVAS) was initiated, integrating the solenoid energy converter with a novel dual pusher-plate blood pump. Several system concepts were evaluated with primary focus on integration of the major system components. A rotary single-stroke actuator concept (MK22) was selected for the energy converter. Other concepts considered are described. Critical component testing continued at an accelerated pace with particular emphasis on the toggle latch and bearings. The first toggle latch is still running without failure at 8000 hours. Thefirst complete solenoid analytic modeLs were developed and the MK22 solenoid designed and tested, demonstrating efficiencies of 70 to 80% over the entire operating range. A breadboard MK22 actuator was designed and fabricated. The first microprocessor-based Monitor/Controller was completed, tested and utilized both in vitro and in vivo. In vivo studies have continued with MK19 and MK20 actuators coupled to the Thoratec Model VID blood pump. 2 model, 2 acute and 3 chronic experiments were undertaken during this period. The last chronic experiment continues on an uneventful postoperative course of synchronous pumping.

PB80-920900 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section V. Medical Devices. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $41.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920999.

The standing order allows one to obtain updates to Section V of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for medical devices. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-920999 PC**$18.00**
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section V. Medical Devices.
1980, 289p FDA/ACA-80/28E
Updates to basic report available as PB80-920900. Complete manual available as PB80-920499. See also PB80-920599, PB80-920699, PB80-920799, PB80-920899, and PB80-921099.

Section V of the Compliance Program Guidance Manual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for medical devices. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

6M. Microbiology:

PB80-138522 PC **A02**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Chemistry.
A Resonance Raman Method for the Rapid Detection, Identification and Quantitation of Bacteria in Sewage and Natural Waters.
Completion rept.,
Wilfred H. Nelson. 1979, 21p W80-03087, OWRT-B-078-RI(1)

Resonance Raman spectroscopy was used to rapidly identify and quantify chromogenic bacteria in water. A rapid and reliable method such as this would be a valuable tool for testing for bacterial contamination in public water supplies as the currently used coliform standards are time consuming and in many cases nonspecific. A series of carotene-containing bacteria were studied including Agmanellum quadruplicatum, Coccochloris elabens, and Rhodopseudomonas palastris. A standard Spex Model 1401 spectrometer with a photon counting detection system was used with incident light at 514.5 and 488.0 nm supplied by a Model CR-2 argon ion laser. Line intensities and energies are presented. Two intense bands were found for each bacterial spectrum. A substantial number of the microorganisms produced specific, interpretable resonance Raman spectra. The spectra were simply obtained, of high quality, and are reproducible. The method will allow for the rapid identification of microorganisms in the presence of 'contaminants' such as sewage and water.

PB80-138936 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Entomology.
Isolation of Lignocellulose Transforming Microbes.
Progress rept. no. 1, 15 Feb-14 Aug 78,
Dale M. Norris. 1978, 8p NSF/RA-780700
Grant NSF-AER77-08279
See also report dated 1979, PB80-118441.

The primary objective of this research is the isolation and identification of microbes, which are ectosymbiotes of wood-inhabiting insects, which degrade native hardwood lignins into substances including appetite stimulants. Thus far the hardwood substrate has been defined. The microbes from the appropriate sources have been isolated and identified. The necessary supplemental nutrient media and other culture conditions for the degradation experiments have been defined. The standard acidolysis method for determining the lignin content of sound wood and experimental samples has been refined. Some work was accomplished in the refinement of insect bioassays to measure the appetite-stimulating properties of substances resulting from the microbial degradation of 002 wood.

PB80-140064 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN. Water Resources Research Center.
'Salmonella sp.' Harbored by Aquatic Fauna as Indices of Fecal Pollution.
Technical rept.,
Erskine V. Morse, and Kent A. Gossett. Jan 80, 71p TR-127, W80-03173, OWRT-B-076-IND-(5)
Contract DI-14-34-0001-6074

The presence of the bacteria Salmonella in the aquatic environment indicates fecal pollution. This study identifies salmonella as a useful and reliable index of contamination of bodies of water used for drinking, bathing, fishing, or aquatic recreational activities. Techniques for collecting water samples were developed. Eleven serotypes were found among 131 salmonella isolates when Wabash River (IND) native fish and fresh water mussels were cultured. Salmonellae were found capable of colonizing the intestinal tract of native fishes. Higher concentrations of salmonellae were found in fish intestinal tracts than were present in environmental water. Several serotypes were present in the fish which were not present in their habitat water. Increased eutrophy of the water decreased infection rates. However when bottom sediment was allowed to 'build up' increased infection rates were evident. Physiological stress increased piscine salmonella infection rates. It is concluded that Salmonella may be used as monitors of fecal pollution in the aquatic biosphere.

PB80-140593 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Procedures for the Microbiological Examination of Production Batch Preparations of the Nuclear Polyhedrosis Virus (Baculovirus) of the Gypsy Moth, 'Lymantria dispar L.'.
Forest Service general technical rept.,
J. D. Podgwaite, and R. B. Bruen. 1978, 12p FSGTR/NE-38, NEFES-80-7

Procedures for the microbiological examination of production batch preparations of the nuclear polyhedrosis virus of the gypsy moth are described. They include methods to count total bacteria and to detect fecal coliform and primary pathogenic bacteria in the preparations. These procedures are consistent with safety guidelines established by the U.S. Environmental Protection Agency (EPA) and they are adaptable for use in the examination of other insect virus preparations.

PB80-141211 PC **A03**/MF **A01**
Medical Coll. of Wisconsin, Miiwaukee. Dept. of Microbiology.
Biological Inducers of Interferon.
Final rept.,
Sidney Grossberg, Patricia Jameson, and J. James Sedmak. 1979, 41p IDB-ASP-10-201
Contract N01-AI-3-2530
See also report dated 15 Apr 75, PB-248 285.

The purpose of this contract was to evaluate and develop interferon inducers. Of all agents tested, the BT-8 vaccine strain of bluetongue virus containing double-stranded RNA induced the greatest amount of antiviral protection and the highest titers of interferon ever reported in mice. Ultraviolet-inactivated virus was essentially as potent in mice in inducing interferon as infectious virus. This interferon could protect mice against lethal virus infections. During the course of this contract a new method for measuring small amounts of protein was also developed.

PB80-141229 PC **A03**/MF **A01**
Rutgers - The State Univ., Piscataway, NJ. Waksman Inst. of Microbiology.

Development of Attenuated Mutants of Respiratory Syncytial Virus and Parainfluenza Viruses as Potential Vaccine Strains.
Final rept. Sep 72-Sep 78,
Robert W. Simpson. 1 Jun 79, 45p DAB-VDP-08-74
Contract N01-AI-2-2504
See also report dated 15 Mar 77, PB-290 603.

This research program has successfully generated temperature-sensitive (ts) mutants of all the candidate viruses; namely, respiratory syncytial (RS) and human parainfluenza virus, types 1, 2 and 3. It remains to be determined whether any of these virus isolates are of suitable genetic stability and sufficiently attenuated for use as potential live virus vaccines. In this regard, it has been found by others that ts mutants of RS virus that appeared to be highly stable in in vitro systems were not satisfactory for their pathogenicity when tested in vivo in non-human primates and vice versa for other RS clones tested to date (R.M. Chanock, personal communication). The workscope of the program was broadened to include a study of persistent infections by the test viruses in cell culture systems and animal hosts. This aspect of the work lead to the finding that RS virus can establish long-term chronic infections of various cell lines and laboratory animals. The program also resulted in the development of useful techniques for viral bioassay and cell cultivation. Finally, some of the virus mutants isolated in this project may be of future utility for basic studies of their genetic and biochemical properties.

6O. Pharmacology

AD-A079 759/7 PC **A03**/MF **A01**
Cincinnati Univ OH Coll of Medicine
Metabolic Disposition of Labeled WR-158,122 in Bile-Duct Cannulated and Bile-Duct Ligated Rats and in a Monkey.
Interim rept. no. 1, 15 Sep-15 Nov 79,
Carl C. Smith, Steele F. Mattingly, Geraldine F. Wolfe, David H. Bauman, and Gary L. Keller. 20 Dec 79, 35p
Contract DAMD17-79-C-9106

Blood levels, excretion, and tissue distribution of WR-158,122 14C were studied in one monkey, 7 bile-duct cannulated rats, 8 bile-duct ligated rats and 2 control rats. The monkey necropsied at 12 hours after dosing excreted 1.8% of the dose in urine and none in feces. It retained 93.6% of the dose in the gastrointestinal tract plus contents. The stomach contained 77.1 percent of the dose, and as a result there was very little drug and/or its metabolites in any other tissue.

N80-16727/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Significance of ACTH for the Process of Formation of Complex Heparin Compounds in the Blood During Immobilization Stress.
B. A. Kudryashov, F. B. Shapiro, F. B. Lomovskaya, and L. A. Lyapina. Nov 79, 14p
NASA-TM-75946
Contract NASW-3198
Tran-Transl. Into English from Fiziol. Zh. Sssr (USSR), V. 61, No. 2, 1975 p 244-250. Misc-Original Language Document Was Announced as A75-31019. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Adrenocorticotropin (ACTH) was administered to rats at different times following adrenalectomy. Adrenocorticotropin caused a significant increase in the formation of heparin complexes even in the absence of stress factor. When ACTH secretion is blocked, immobilization stress is not accompanied by an increase in the process of complex formation. The effect of ACTH on the formation of heparin complexes was mediated through its stimulation of the adrenal cortex.

PB80-134356 PC **A13**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Consumer Reactions to Four Prototype Patient Package Inserts for Erythromycin: A Focus Group Analysis. Volume I: Summary Analysis. Volume II: Edited Transcriptions.
Final rept.,
L. A. Morris, S. Morris, D. Thilman, and J. Guerin. Mar 79, 291p FDA/BD-80/7
Contract FDA-223-78-3010

Report covers focus group discussions conducted by the Uniworld Group for FDA regarding four versions of erythromycin PPIs. Volume I contains a content analysis of the four different PPI versions and major observations made by the focus group participants. Key points covered in the four groups were overall concepts regarding PPIs in general, and their initial reactions to a specific PPI version of erythromycin (physical characteristics, format, tone, readability, level of detail, general content). Volume II contains the slightly edited transcripts of the four focus group sessions. Participant profiles are included.

PB80-139884 PC **A19**/MF **A01**
Data Transformation Corp., Washington, DC.
The Antibiotic Prescription Patterns of Primary Care Physicians. Final Report and Methodological Appendices.
Mar 79, 436p FDA/BD-80/46
Contract FDA-223-75-3007
Prepared in cooperation with Shosteck (Herschel) Associates, Silver Spring, MD.

Based on a national sample of 1,700 primary care physicians, this study examines antibiotic prescription practices and the factors which influence them. The research uncovers what, in general, appears to be appropriate antibiotic prescription practices in all cases except undifferentiated upper respiratory tract infections -- the 'common cold'. In such cases, there is a tendency for physicians to prescribe antibiotics in the absence of clear clinical signs of infections. The research consistently documents that year of medical school graduation is overwhelmingly the most important predictor of physicians attitudes toward antibiotics and the use of them. Other factors are of secondary importance.

PB80-920600 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section II. Drugs. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $97.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920699.

The standing order allows one to obtain updates to Section II of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for drugs. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

6P. Physiology

AD-A079 537/7 PC **A02**/MF **A01**
New York Medical Coll NY
Hemorheological Aspects of the Endothelium-Plasma Interface,
A. L. Copley. 7 Aug 73, 22p
Contracts N00014-67-A-0449-0002, N00014-75-C-0222
Pub. in Microvascular Research, v8 p192-212 1974. Sponsored in part by Contract Nonr-2754.

No abstract available.

AD-A079 821/5 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
Evoked K-Complexes and Cardiovascular Responses to Spindle-synchronous and Spindle-Asychronous Clicks during NREM Sleep,
Michael W. Church, Laverne C. Johnson, and David M. Seales. 2 Feb 78, 14p Rept no. NAVHLTHRSCHC-77-31
Pub. in Electroencephalography and Clinical Neurophysiology, v45 p443-453 1978.

No abstract available.

N80-16720/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Catecholamines and Myocardial Contractile Function During Hypodynamia and with an Altered Thyroid Hormone Balance.
G. M. Pruss, V. I. Kuznetsov, and A. A. Zhilinskaya. Jan 80, 17p NASA-TM-76000
Contract NASW-3199
Tran-Transl. Into English from Izv. Akad. Nauk Sssr, Ser. Biolhk. (USSR), No. 2, 1975, p 187-195. Misc-Original Language Document Previously Announced as A75-32600. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Vitebsk State Medical Inst. (Ussr).

The dynamics of catecholamine content and myocardial contractile function during hypodynamia were studied in 109 white rats whose motor activity was severely restricted for up to 30 days. During the first five days myocardial catecholamine content, contractile function, and physical load tolerance decreased. Small doses of thyroidin counteracted this tendency. After 15 days, noradrenalin content and other indices approached normal levels and, after 30 days, were the same as control levels, although cardiac functional reserve was decreased. Thyroidin administration after 15 days had no noticeable effect. A detailed table shows changes in 17 indices of myocardial contractile function during hypodynamia.

N80-16728/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Ingestion of Cold and Hot Water on the Course of Thermal Changes in the Stomach and Intestine.
Y. L. Batinkov. Sep 79, 12p NASA-TM-75515
Contract NASW-3199
Tran-Transl. Into English from Fiziol. Zh. Sssr (USSR), V. 27, No. 1, 1939 p 108-114. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By First Med. Clinic, Crimean Med. Inst. Imenistalin (USSR).

With the use of a thermocouple and mirror galvanometer, calibrated before the experiment and after each test, it was found that the normal temperature in the esophagus is 0.1-0.4 C higher than in the oral cavity, the temperature in the duodenum is somewhat less than in the stomach, but higher with cholecystitis, duodenitis or gastritis, the temperature in the normal stomach equals or is somewhat higher than in the esophagus, and that the temperature of distended stomachs frequently is lower than in the esophagus. It was found that hot water is retained in the stomach longer than cold water, and that both hot and cold water are allowed to pass into the duodenum when the water temperature becomes approximately equal to that of the surrounding organs.

PB80-132707 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
A Hemodynamic Model for Relating Phasic Pressure and Flow in the Arteries.
Biomedical study rept.,
W. H. Guier. Dec 79, 91p JHU/APL/CP-072

A relatively simple model of the arterial circulation is presented that is applicable to the hemodynamic manipulation of research animals and to patient monitoring in the critical care situation. The model includes both dynamic propagation and capacitive windkessel (pressure vessel) effects of the arterial tree such that the dynamics of both systole and diastole are encompassed; yet it is of only intermediate complexity and is therefore appropriate for clinical use where computational resources are limited. Three examples are presented, including appropriate computational algorithms to illustrate use of the model in monitoring applications.

PB80-135080 PC **A05**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Hearing Levels of Youths 12-17 Years, United States.
Vital and health statistics series,
Jean Roberts, and Elizabeth M. Ahuja. Jan 75, 93p VHS/SER-11-145, DHEW/PUB/HRA-75-1627
Library of Congress catalog card no. 74-11318.

The report shows the distribution of monaural hearing levels of youths 12-17 years as frequen-

cies of 250, 500, 1000, 2000, 3000, 6000, and 8000 Hertz as determined in individual air-conduction tests by age, sex, race, geographic region, size of place of residence, family income, and education of parent.

PB80-135098 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Color Vision Deficiencies in Children, United States.
Vital and health statistics series,
James Scanlon, and Jean Roberts. Aug 72, 42p
VHS/SER-11-118, DHEW/PUB/HSM-73-1600
Library of Congress catalog card no. 74-190010.

The report presents the prevalence of color vision deficiencies, as identified on examination with plates from the Ishihara Test and typed with the Hardy-Rand-Ritter Test, among children of 6-11 years by age, sex, race, family income, and area of residence.

PB80-140320 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Hearing Levels of Children by Age and Sex, United States.
Vital and health statistics series.
Feb 70, 60p PHS-PUB-1000-SER-11-102
Pub. as Vital and Health Statistics Ser-11-102. Library of Congress catalog card no. 75-602404.

The report contains estimates of hearing levels for children 6-11 years of age in the United States as determined in the second cycle of the Health Examination Survey. Also gives findings by age and sex for the right ear, left ear, and better ear at each of the test frequencies, as well as presenting estimates of hearing levels for speech.

6Q. Protective Equipment

AD-A080 052/4 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Calculations of Combined Heat and Vapour Transport through Clothing Systems: Application to Water-Vapour-Permeable Rainwear.
Technical note,
B. Farnworth. Oct 79, 29p Rept no. DREO-TN-79-16
Summary in French.

A numerical model has been developed to calculate the combined heat and vapour flow, at steady state, through multilayer clothing systems including heat transfer by radiation and the condensation of water vapour within the clothing system. The model has been applied to a comparison of the heat stress and water accumulation expected in rainwear made of completely impermeable material and of a water-vapour-permeable laminate, when the wearer works hard enough to promote sweating. The results indicate significant advantages can expected from the permeable rainsuit. (Author)

AD-B020 804/1 PC **A02**/MF **A01**
Southern Research Inst Birmingham Ala
Study of Reactive Materials for Development of New Protective Clothing Concepts.
Quarterly progress rept. no. 2, 11 Feb-20 May 77,
Donald R. Cowsar, Danny H. Lewis, and Gary W. Whitehead. Jul 77, 15p SORI-3808-2, ARCSL-CR-77033
Contract DAAA15-77-C-0015
Distribution limitation now removed.

This report describes investigations of reactive materials suitable for incorporation in or on fabrics for protection from percutaneous chemical warfare agents. Microencapsulated forms of alkali metal hydroxides and aliphatic amines were prepared and are currently being evaluated as reactive materials for the deactivation of chemical agents. Preliminary results indicate that agent simulants can be effectively neutralized by the encapsulated materials. (Author)

AD-B022 386/7 PC **A02**/MF **A01**
Southern Research Inst Birmingham Ala
Study of Reactive Materials for Development of new Protective Clothing Concepts.
Quarterly rept. no. 3, Mar-Aug 77,
Donald R. Cowsar, Danny H. Lewis, and Gary W. Whitehead. Oct 77, 20p SORI-3808-3, ARCSL-CR-77056
Contract DAAA15-77-C-0015
Distribution limitation now removed.

This report describes investigations of reactive materials suitable for incorporation in or on fabrics for protection from percutaneous chemical warfare agents. Microencapsulated forms of alkali metal hydroxides and aliphatic amines were prepared and are currently being evaluated as reactive materials for the deactivation of chemical agents. Preliminary results indicate that agent simulants can be effectively neutralized by the encapsulated materials. (Author)

AD-B022 565/6 PC **A02**/MF **A01**
Utility Research CO Montclair Nj
A Study on Optically Transparent Polyurethane Coatings for the New Protective Mask.
Final technical rept. Jun 76-Feb 77,
John A. Brown, and Harry S. Katz. Oct 77, 22p
ARCSL-CR-77041
Contract DAAA15-76-C-0136
Distribution limitation now removed.

A wide range of urethane lacquer formulations - especially crosslinked, cure-in-place urethanes - were studied and evaluated as topcoats for the Army's New Protective Mask. Excellent optical clarity, excellent flexibility, and excellent solvent and abrasion resistance were all obtained, but not all in the same formulation.

N80-16118/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
Nitrogen Dioxide Vapor Penetration of Chlorobutyl Rubber Scape under Operational Conditions.
T. A. Schehl, and T. W. Beall. Feb 80, 78p
NASA-TP-1605

Operational self contained atmospheric protective ensembles (SCAPE suits) and fabric from the suits were subjected to a series of tests designed to determine the amount of exposure a wearer of the suit would receive if a spill of the hypergolic oxidizer nitrogen tetroxide (N_2O_4) should occur nearby. The results of these tests show that a wearer of a 'stock' SCAPE suit equipped with a standard liquid air pack, if exposed to a spill resulting in a 26 percent increase of oxidizer in the surrounding atmosphere, will experiment no detectable concentration of nitrogen dioxide (NO_2) inside the suit for 15 minutes. Thereafter, the NO_2 concentration within the suit will increase for 35 minutes at a rate of 0.07 ppm per minute and then at a gradually decreasing rate until an equilibrium concentration of 3.4 ppm is attained after 100 minutes. Momentary increases of as much as 1.6 ppm can be expected if the wearer were to rise quickly from a squatting position, but the additional NO_2 would be dissipated within three minutes. The effect of liquid and vapor N_2O_4 and of liquid monomethylhydrazine on permeation rates and tensile strength of the SCAPE suit fabric was also investigated.

PAT-APPL-6-100 578 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Chemical-Biological Agent Protective Hood.
Patent Application,
William R. Canda . Filed 5 Dec 79, 19p AD-D006 882/5
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A protective hood for protecting flight crewmembers from chemical-biological agents having a nonpermeable covering which fits over the helmet and extends over the shoulders of the flight suit. A rigid transparent lens is sealed to the helmet covering and is positioned in front of the flight helmet visor assembly. A hose enclosure memeber is secured to the helmet covering and is closed around the oxygen hose with hook and loop fasteners. Hook and loop fasteners also provide a closure for the front of the helmet covering and shoulder covering members. Openings, sealed with pocket members are provided on the side of the protective hood to permit adjustment of the visor. An air nozzle is provided under the hood to provide flushing of chemical-biological agents as well as cooling and evaporative action in the facial region. (Author)

6R. Radiobiology

AD-A079 750/6 PC **A02**/MF **A01**
California Univ Berkeley Statistical Lab
Avenue to Understanding the Mechanism of Radiation Effects. Extended Serial Sacrifice Experimental Methodology,
Jerzy Neyman. Jan 80, 20p Rept no. CU-SL-80-01-ONR
Contract N00014-75-C-0159

The visualized avenue towards understanding the mechanism of the effects of radiation on the health of animals used in the experiments is, primarily, through willing interested cooperation between experimenting biologists, on the one hand, and equally willing and interested mathematical statisticians on the other. A review of the developments over two recent decades leads the author to the following conclusions relating to experimental designs. (1) The design of survival experiments with serial sacrifices due to Arthur C. Upton is basic, but (2) This design needs an extension. The building of this extension depends very much on the inventiveness of experimenting biologists. (Author)

AD-A079 799/3 PC **A08**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Laser Hazards Bibliography - October 1979,
David H. Sliney, Nicholas Krial, David W. Griffis, and Laura L. Ryan. Oct 79, 169p
Supersedes report dated Aug 78, AD-A061 958.

The Laser Hazards Bibliography consists of 2,088 references in the open literature broken into subject categories which relate to general biological effects, the eye, the skin, laser safety, laser propagation in the atmosphere, and laser measurements. (Author)

AD-A079 830/6 PC **A03**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Low-Power Laser Alteration of Physiological Processes.
Final rept. Oct 78-Apr 79,
Ronald D. Reed. Nov 79, 41p Rept no. SAM-TR-79-29

The report summarizes a recent analysis of research concerning the alteration or stimulation of biological processes by low-power laser irradiation. A survey of reported studies is given, along with abstracted biomedical case reports. The analysis compares reported laser exposure levels to current safety standards, solar irradiance levels, and exposure levels from published reports of low-level laser effects on visual function. An estimated depth of penetration for the commonly used helium-neon laser is calculated. Thermal modeling was used, with reported laser exposure levels, to estimate the possible contribution of hyperthermia to reported bioeffects. Possible mechanisms are discussed for the coupling of laser energy to cellular processes. Results are correlated to current Air Force research on laser bioeffects. (Author)

NUREG/CR-1064 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. School of Public Health.
Performance Testing of Personnel Dosimetry Services.
Final rept. Oct 77-Sep 79,
Phillip Plato, and Glenn Hudson. Jan 79, 91p
Contract NRC-01-77-180

The University of Michigan conducted a two-year pilot study of the Health Physics Society Standards Committee (HPSSC) Standard, 'Criteria for Testing Personnel Dosimetry Performance.' Pilot study objectives were: (1) To give processors an opportunity to correct any problems that are uncovered; (2) To develop operational and administrative procedures to be used later by a permanent testing laboratory; and (3) To determine whether the proposed HPSSC Standard provides an adequate and practi-

cal test of dosimetry performance. The Final Report discusses the feasibility of using the HPSSC Standard for a future mandatory testing program for personnel dosimetry processors, the third objective of the pilot study. This report contains the results of the pilot study and recommendations for revisions in the Standard that will make a mandatory testing program useful to regulatory agencies, dosimetry processors, and radiation workers that use personnel dosimeters.

PB80-921000 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section VI. Radiological Health. Updates.
Irregular repts.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $44.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-921099.

The standing order allows one to obtain updates to Section VI of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for those products monitored for radiation. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PB80-921099 PC$20.00
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section VI. Radiological Health.
1980, 320p FDA/ACA-80/28F
Updates to basic report available as PB80-921000. Complete manual available as PB80-920499. See also PB80-920599, PB80-920699, PB80-920799, PB80-920899, and PB80-920999.

Section VI of the Compliance Program Guidance Maual provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for those products monitored for radiation. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

6S. Stress Physiology

AD-A079 559/1 PC **A03**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
Quan*ifiable Effects of Noise on Humans,
Daniel L. Johnson. Jan 80, 42p Rept no. AMRL-TR-79-18

Quantifiable effects of noise are defined as those effects that demonstrate both a clear causal relationship, and also an increase of severity of the effect with the magnitude of the noise exposure. While possible noise effects, such as elevated blood pressure and sleep interference, are discussed, a rationale is given for not considering these effects as quantifiable. The three quantifiable effects of noise are identified. These are induced hearing loss, speech/activity interference, and general community response. Measurement and evaluation of each of these effects are discussed. Recommendations and exceptions to evaluating the environmental effects of noise are provided. Although the author recognizes the occasional need of other noise descriptors, the basic descriptor promoted by the EPA and accepted by the Department of Defense, the Day Night Sound Level, is recommended for measuring environmental tests. This measure provides a reasonable assessment of the three quantifiable effects for most types of environmental noises. (Author)

AD-A079 567/4 PC **A03**/MF **A01**
State Univ of New York At Buffalo Hyperbaric Research Lab
Effects of Immersion and Static Lung Loading on Submerged Exercise at Depth,
E. D. Thalmann, D. K. Sponholtz, and C. E. G. Lundgren. Feb 79, 34p
Contracts N00014-78-C-0205, N00014-76-C-0472
Pub. in Undersea Biomedical Research, v6 n3 p259-290 1979.

No abstract available.

AD-A079 573/2 PC **A03**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Physiological Responses of Men and Women to Humid and Dry Heat,
Yair Shapiro, Kent B. Pandolf, Barbara A. Avellini, Nancy A. Pimental, and Ralph F. Goldman. Nov 79, 29p

The major objective of this study was to determine whether sex-related differences in thermoregulation exist; and if so, whether there was any method to define these differences. A major methodological problem of the study was the inability to find groups of males and females matched in all their physical characteristics, namely: body weight, skin surface area, percentage of body fat and cardiorespiratory physical fitness. This problem was partially solved by dividing each sex into two subgroups and matching the subgroups as 'small' males vs. 'big' females, or more fit females vs. less fit males. The sex-related differences concluded from this investigation are summarized in Table 4. In comfortable climatic conditions (20 C, 40% rh) men and women reacted in a physiologically similar fashion. Under wet conditions, whether mild or hot, females tolerated the heat better than males. They displayed lower deep body and skin temperatures, and therefore lower heat storage, while demonstrating lower sweat rates and subsequently less dehydration than males. In contrast, under hot-dry conditions, males seemed to be at a physiological advantage. Compared to females, they showed lower deep body and skin temperatures, lower HR, lower heat storage, and similar sweat rates. (Author)

AD-A079 577/3 PC **A03**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Persistence of Impaired Heat Tolerance from Artificially Induced Miliaria Rubra,
Kent B. Pandolf, Tommy B. Griffin, Ella H. Munro, and Ralph F. Goldman. 10 Sep 79, 27p Rept no. USARIEM-M-23/79

Acclimatization to heat was conducted in these subjects to provide a reasonably equivalent experimental baseline from which to conduct the study. Heat acclimatization has been found by some to result in a reduction in sweat chloride provoked primarily by a salt deficit, while the chloride concentration is found to be greatly increased in the sweat from areas involving miliaria. These incongruous findings may point out the over importance placed on increased chloride concentration in the pathophysiology associated with miliaria particularly as it affects performance. Nevertheless, since acclimatized, the individuals are better able to maintain fluid balance than those not acclimatized, the importance of the reduced tolerance times of these experimental subjects is further magnified. The findings from this investigation clearly illustrate that one severe bout of laboratory-induced miliaria rubra results in a marked reduction in performance and an increase in several physiological responses of these individuals compared to matched controls. Had the humidity been elevated to that of jungle conditions, it is quite possible that the results would have been even more dramatic. The distribution of sweat glands differs in various areas of the body. The effect of heat rash on different areas of the body and associated work-heat the body. The effect of heat rash on different areas of the body and associated work-heat performance responses is not known.

AD-A079 680/5 PC **A02**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Mental Abilities during a Simulated Dive to 427 Meters Underwater.
Final rept.,
Robert C. Carter. 20 Nov 78, 10p Rept no. NEDU-12-79

No abstract available.

AD-A079 818/1 PC **A02**/MF **A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
Effects of Acoustic Stimuli on the Vestibular System,
C. Stanley Harris. 1971, 13p Rept no. AMRL-TR-71-58
Pub. in AGARD Conference Proceedings, n95 pt1 pA7-1 thru A7-11 1971. Presented at the Annual Aerospace Panel Meeting of AGARD (28th), Luchon (Haute Garonne), France, 27 Sep-1 Oct 71.

No abstract available.

AD-A080 058/1 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Physiological and Psychomotor Effects of Low Altitude Air Combat Maneuvering.
Phase rept.,
Jeffry S. Bowman, Joseph M. Hagen, and Harald von Beckh. 29 Nov 79, 24p Rept no. NADC-79283-60

A human centrifuge was used to simulate the in-flight stresses and aircraft maneuvers involved in low altitude, air combat scenarios. The effects of these scenarios on aircrew physiological function and psychomotor performance were studied in depth. The in-flight stresses encountered included a realistic ACM profile, ground effect/high speed or stall buffet, as well as moderate and high intracockpit temperatures. Various methods of ameliorating the effects of these stressors were studied simultaneously. These included varying the pilots' seatback angle, with or without concomitant changes in armrest positioning, and decreasing the intra-cockpit temperature to low levels. Analysis of the physiological and psychomotor performance data revealed the following: (1) raising or lowering intra-cockpit temperature, from an ambient level, has a significant effect on the pilots' physiological and psychomotor performance under the conditions studied, (3) the effects of buffet were minor compared to changes in intra-cockpit temperature, so far as physiological or performance functions are concerned, (4) a simple adjustment in armrest position, concomitant with seatback angle alterations, produces significant changes in performance capabilities. Details of these and other physiological/performance findings, as well as hematological and biochemical findings, are discussed.

AD-A080 059/9 PC **A03**/MF **A01**
Oklahoma Univ Health Sciences Center Oklahoma City Dept of Otorhinolaryngology
Studies of Aural Nonlinearity and the Mechanisms of Auditory Fatigue.
Annual rept. 1 Oct 78-13 Jul 79,
John Erdreich. 1 Sep 79, 34p
Contract DAMD17-78-C-8074

A study relating individual differences in certain auditory and physiological parameters to individual susceptibility to auditory threshold shifts has been started. This report describes progress from 1 October 1978 to 13 July 1979. The initial parameter under study was auditory amplitude nonlinearity. However, in the process of the investigation, examination of the data suggested that tobacco smoking habits might be a confounding variable and this was investigated separately. The preliminary data suggest that smoking does predispose the individual to higher fatigued threshold shifts. Data at 1KHz suggest a relationship between amplitude non-linearity and threshold shifts. The results at 500 Hz and 2KHz are less clear. Reasons for this are discussed. Additional data must be acquired and analyzed before the relation between nonlinearity and impulse and continuous noise-induced TTS can be fully evaluated. (Author)

AD-B011 676/4 PC **A05**/MF **A01**
Westinghouse Defense and Electronic Systems Center Baltimore MD Systems Development Div
Effects of Vibration and G Loading on Airborne E-O Sensor Augmented Observers.
Final rept. 2 Feb-30 May 75,
Robert H. Willson, Frederick A. Rosell, and Heru Ra Walmsley. Apr 76, 89p AFAL-TR-75-172
Contract F33615-75-C-1067
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

Psychophysical experiments were performed to quantitatively determine the effect of vibration and

g loading on the ability of observers to perform certain visual tasks in a realistic flight environment. The test aircraft used was a corporately owned Sabreliner. The performance of four observers was measured on the ground, in straight and level flight, under conditions of moderate-to-severe turbulence and under conditions of sustained g loading. The test images were televised squares and bar patterns to which white noise of various amounts were added. It was found that the observers were unaffected by straight and level flight, were not appreciably affected by g loading but were moderately affected by turbulence. (Author)

N80-16718/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Glucose Metabolism in Different Regions of the Rat Brain under Hypokinetic Stress Influence.
K. Konitzer, and S. Voigt. Jan 80, 15p NASA-TM-75949
Tran-Transl. Into English from Acta Biol. Med. Ger. (Germany, D.R.), V. 35, 1976 p 853-866. Subm-Transl. By Kanner (Leo) Associates, Redwood City, California.

Glucose metabolism in rats kept under long term hypokinetic stress was studied in 7 brain regions. Determination was made of the regional levels of glucose, lactate, glutamate, glutamine, aspartate, gamma-aminobutyrate and the incorporation of C-14 from plasma glucose into these metabolites, in glycogen and protein. From the content and activity data the regional glucose flux was approximated quantitatively. Under normal conditions the activity gradient cortex and frontal pole cerebellum, thalamus and mesencephalon, hypothalamus and pons and medulla is identical with that of the regional blood supply (measured with I131 serum albumin as the blood marker). Within the first days of immobilization a functional hypoxia occurred in all brain regions and the utilization of cycle amino acids for protein synthesis was strongly diminished. After the first week of stress the capillary volumes of all regions increased, aerobic glucose metabolism was enhanced (factors 1.3 - 2.0) and the incorporation of glucose C-14 via cycle amino acids into protein was considerably potentiated. The metabolic parameters normalized between the 7th and 11th week of stress. Blood supply and metabolic rate increased most in the hypothalamus.

N80-16719/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Morphological and Functional Manifestations of Rat Adrenal-Cortex Response to Sodium Bromide Administration under Hypodynamic Stress.
L. T. Kirichek, and V. I. Zholudeva. Nov 79, 12p NASA-TM-7593
Contract NASW-3198
Tran-Transl. Into English from Farmakol. Toksikol. (USSR), V. 38, No. 6, Nov. - Dec. 1975 p 703-706. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Functional and morphological manifestations of adrenal cortex response to hypodynamia (2-hr immobilization on an operating table) under the influence of bromine preparations were studied. The sodium bromide was administered intraperitoneally in 100, 250, and 500 mg/kg doses once and repeatedly during ten days. The adrenal gland was evaluated functionally by ascorbic acid and cholesterol content and morphologically by coloring it with hematoxylin-eosin and Sudans for lipid revealing at freezing. Results are displayed in two tables and microphotographs. They are summarized as follows: the bromine weakens the functional state of the adrenal cortex in intact rats, causing changes similar to those under stress. During immobilization combined with preliminary bromine administration, a less pronounced stress reaction is noticeable.

N80-16726/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Gravitation Stress and Hypokinesia on Blood Vessels of the Testicle.
E. F. Palazhchenko. Nov 79, 14p NASA-TM-75942
Contract NASW-3198
Tran-Transl. Into English from Arkh. Anat. Gistol. Embriol. (USSR), V. 64, No. 5, 1973 p 57-63. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Rabbits were exposed to single maximum endurable stresses of cranio-caudal direction, hypokinesia for periods of one to eight weeks, and hypokinesia followed by gravitation stresses. The stresses caused dilatation of vessels, greater sinuosity, and occasional ruptures of the walls and extravasation. The greater part of the capillaries were dilated; the greatest part constricted. In hypokinesia there was an increasing atrophy of the testes. Significant results are reported.

6T. Toxicology

AD-A079 609/4 PC **A05**/MF **A01**
California Univ Irvine
Environmental Quality Research Fish and Aufwuchs Bioassay.
Annual rept. no. 4, 1 Jun 78-31 May 79,
Stephen A. Klein, and David Jenkins. Oct 79, 80p AMRL-TR-79-70
Contract F33615-76-C-5005

This report contains the results of research efforts of a project concerned with defining the effects of potential environmental contamination resulting from the use of certain Air Force materials on fresh water and saline water fish. Materials being evaluated include JP-4, JP-8, and the hydrazines. Techniques for exposing organisms to these substances are discussed and results of such exposures are presented. (Author)

AD-A079 692/0 PC **A02**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
A Computer Model for Evaluating the Effects on Fighting Vehicle Crewmembers of Exposure to Carbon Monoxide Emissions.
Final rept.,
Seymour Steinberg. Jan 80, 15p Rept no. HEL-TN-1-80

Presented are the details of a computer model, developed from an empirical equation derived by several researchers, which predicts the instataneous amount of carboxyhemoglobin (COHb) in the blood of a person based upon the amount of carbon monoxide (CO) respired during a sequence of exposure periods. The computer program is particularly useful in the analysis of CO toxic hazards as applied to crewmembers of enclosed fighting vehicles in that the predicted COHb levels provide the evaluator with the means to predict whether or not human performance may be compromised or the health and safety of any crewmember jeopardized. An appendix provides the reader with both a complete program listing (FORTRAN IV) and a sample presentation of a hypothetical mission for tank crewmembers. (Author)

AD-A079 939/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Neuropsychic Disorders in Trichlorfon Poisoning.
V. I. Barabash. 21 Aug 79, 11p Rept no. FTD-ID(RS)T-1179-79
Edited trans. of Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (USSR) v71 n4 p594-598 1971, by John G. Hanus.

No abstract available.

AD-A079 960/1 PC **A03**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Inhalation Toxicities of N,N-Diethyl-Meta-Toluamide (M-Det), January - May 1979.
Special study on Phase 4,
Joseph A. Macko, and Jeffrey D. Bergmann. 21 Jan 80, 44p Rept no. USAEHA-75-51-0034-80

No toxic signs were seen in the six male rats exposed to saturated vapor of m-Det at room temperature for an 8-hour exposure period. Transient hyperemia was seen in rats during the 100 C m-Det saturated vapor exposure. The acute aerosol LC50 for rats was 5950 mg/cu m. Transient toxic signs were seen in the rats and dogs exposed to m-Det during the 13-week subchronic inhalation study. Toxic signs ranged from red exudate around the eyes and noses of the rats exposed to 1500 mg/cu m of m-Det to periodic vomiting of dogs exposed to 750 and 1500 mg/cu m of the test compound. No gross or histological lesions were attributable to the inhalation of m-Det aerosol. M-Det may have induced spermhead abnormalities in rats under the condition of the subchronic inhalation exposure, although the observed effects were small. It is concluded that inhalation of m-Det insect repellent at the 750 mg/cu m level and below presents little acute inhalation hazard to man. Concentrations above this level may cause transitory eye and respiratory irritation. M-Det may induce spermhead abnormalities at the high concentration (1500 mg/cu m) tested, although the observed effects were small. Behavioral changes were evidenced at all exposure levels, but their significance to human health is unknown. (Author)

AD-A080 024/3 PC **A03**/MF **A01**
California Univ Irvine
Environmental Quality Research: Use of Unicellular Algae for Evaluation of Potential Aquatic Contaminants.
Rept. no. 4 (Annual) 1 Jun 78-31 May 79,
Peter S. Dixon, Jan Scherfig, and Carol A. Justice. Nov 79, 29p AMRL-TR-79-90
Contract F33615-76-C-5005

Several species of marine and freshwater algae were used in bioassays to determine the effects of potential aquatic contamination which might result from the use of hydrazine propellants. Techniques are described for both chronic and spill types of exposure and the results of each are discussed. Compounds evaluated included hydrazine, monomethylhydrazine, and unsymmetrical dimethylhydrazine. (Author)

AD-A080 045/8 PC **A06**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Medicine
Effects of Ozone on Exercising and Sedentary Adult Men and Women Representative of the Flight Attendant Population,
E. A. Higgins, M. T. Lategola, J. M. McKenzie, C. E. Melton, and J. A. Vaughan. Oct 79, 105p Rept no. FAA-AM-79-20

Three studies at two ozone concentrations have been carried out in an attempt to define the effect level for ozone under simulated flight conditions. All experiments were carried out in an altitude chamber held at 6,000 feet MSL; relative humidity was kept at 10-12 percent and temperature at 68 - 74 F. Subjects wre paid nonsmoking men and women in their third decade who had the anthropomorphic characteristics of airline flight attendants. All subjects were exposed to ozone in one experiment and to air only in another. Order of presentation of the experiments was balanced, and sessions were separated by 1 week. Study 1 consisted of exposure of 15 men and 12 women to 0.20 parts per million by volume (ppmv) ozone for 4 h with treadmill exercise for the last 10 min of each hour. In the second study 14 men and 14 women were exposed to 0.30 ppmv ozone for 3 h with 10 min exercise at the end of each hour. The third study consisted of exposure of 14 men and 14 women to 0.30 ppmv without exercise. Cardiopulmonary, performance, visual, and symptoms assessments were made.

PB80-130834 PC **A04**/MF **A01**
Scripps Clinic and Research Foundation, La Jolla, CA. Dept. of Biochemistry.
Effects of Pesticides on the Immune Response.
Final rept. 16 Feb 77-30 Apr 79,
Walter B. Dandliker, Arthur N. Hicks, Stuart A. Levison, Kris Stewart, and R. James Brawn. Sep 79, 52p EPA-600/1-79-039
Grant EPA-R-803885

The influence of various pesticides on the humoral and cellular immune response to fluorescein labeled ovalbumin has been analyzed. Pesticides (Aroclor 1260, Dinoseb, Parathion, pentachloronitrobenzene, piperonyl butoxide, mixed pyrethrins and Resmethrin) were administered intragastrically in corn oil in one dose (one half of LD50) before primary immunization. Control groups included those treated with corn oil alone

or immunosuppressed with Methotrexate. Booster immunizations and test bleedings were scheduled at weekly intervals thereafter. The cellular immune response was quantified by redness and swelling, histological examination and by differential temperature measurements of the foot pads after antigen challenge. The concentration, binding affinity and heterogeneity of the serum antibody were determined by fluoroscience polarization measurements. Dinoseb and Parathion depress both the humoral and cellular response. Methotrexate and pentachloronitrobenzene give a late stimulation, while Resmethrin an early, sometimes very marked stimulation of the cellular immune response. Other pesticides showed little or no effect under the conditions tested. Effects on the humoral response were limited to changes in antibody concentration, the binding affinity being nearly constant in all instances.

PB80-136849 MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Lead Based Paint Poisoning Research. Review and Evaluation, 1971-1977.
Irwin H. Billick, and V. Eugene Gray. Jul 78, 161p HUD-0000809
Paper copy available from the Sup. of Docs., Stock number 023-000-00480-1

HUD has had an active program aimed at the elimination of lead poisoning in children since the passage of the Lead - Based Paint Poisoning Prevention Act in 1971. This report is an evaluation of HUD's program to determine the progress accomplished and to locate any errors or misdirections in policy. In addition, a part of the evaluation involved consultations with a panel of scientific experts from the National Academy of Sciences, whose objectives were to produce a comprehensive assessment of the scientific issues involved and to examine research needs and recommend scientific approaches to the problem. This report consists of a historical overview of HUD's programs, followed by a technical discussion of the research conducted in three major areas: lead hazard detection and identification and development of improved prototype lead - in - paint detectors, lead - based paint hazard abatement techniques and technology cost assessment, and the nature and extent of lead poisoning. HUD is creating and analyzing a data base of lead levels in children, and associated demographic data, collected by the local lead poisoning screening programs. Lead poisoning rates appear to be highest for 2 and one - half year olds and for black children. A small but significant area of the HUD research program, local program aid and technical assistance, also is reviewed. Appendices, tables, graphs, and reference notes accompany the text.

PB80-139561 PC **A08**/MF **A01**
Kansas Water Resources Research Inst., Manhattan.
The Development of Water Quality Criteria for Ammonia and Total Residual Chlorine for the Protection of Aquatic Life in Two Johnson County, Kansas Streams.
Project completion rept.,
Ralph H. Hazel, Carl E. Burkhead, and Donald G. Huggins. Dec 79, 159p W80-03082, OWRT-A-088-KAN(1)

Mill Creek and Cedar Creek in Johnson County, Kansas, were sampled monthly from December 1977 through May 1979 to determine water quality data for the streams. Also studied were toxicity levels for selected stream fauna and fauna response to artificially stressed stream conditions. From the data, water quality criteria for ammonia and total residual chlorine (TRC) were developed. At each sampling site three samples were taken; one acid fixed for ammonia analysis, one for bacteriological testing, and one for other parameters such as pH, hardness, alkalinity, conductivity, and turbidity. Other on-site measurements were also made such as temperature and dissolved oxygen. Species used for the 96 hour acute toxicity test for ammonia and TRC include the orange throated darter, the red shiner, crayfish, and the riffle beetle.

PB80-805823 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biological Effects of Lead Pollution. Volume 2. 1978-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Feb 80,
Elizabeth A. Harrison. Mar 80, 106p
Supersedes NTIS/PS-79/0229, NTIS/PS-78/0124, and NTIS/PS-77/0129. See also Volume 1, 1964-1977, NTIS/PS-79/0228.

The volume contains selected abstracts covering the effects of environmental lead contamination on plants, animals, and humans. Included are references which concern the distribution and quantities of lead in various plants and animals. (This updated bibliography contains 99 abstracts, 48 of which are new entries to the previous edition.)

PB80-915000 Subscription
National Library of Medicine, Bethesda, MD. Toxicology Information Program.
Toxi-Tips.
Monthly repts.
1980, 12 issues
Paper copy available on subscription, North American Continent price $35.00/year; all others write for quote. Single copies also available.

TOX-TIPS results from a cooperative effort to prevent the duplication of toxicity testing programs and epidemiology studies to determine toxic risks of chemical substances and other agents. Input to TOX-TIPS is submitted on Science Information Exchange (SIE) Notice of Research Project forms included in each TOX-TIPS issue. Prompt reporting of new projects to the Editor, TOX-TIPS reduces the chances of duplication as material is usually printed in the first issue scheduled after its receipt. After the project description and related data are published, the information is relayed to SIE for inclusion in that national database of information on research-in-progress. Inquiries and requests for sample issues of publications should be directed to the EDITOR, TOX-TIPS at the National Library of Medicine. Subscription activities are managed by the National Technical Information Service which should be contacted directly.

7. CHEMISTRY

7A. Chemical Engineering

PAT-APPL-6-072 957 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Removal of Impurities from Clay.
Patent Application,
Judith A. Eisele, Donald J. Bauer, and Paul F. Bremner. Filed 6 Sep 79, 15p PB80-139454
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is described for producing substantially pure alumina from kaolin clay by removing in a soluble form impurities which contaminate the alumina while the aluminum is maintained in an insoluble form. This is accomplished by leaching calcined kaolin clay with at least 36 weight per cent hydrochloric acid to dissolve the impurities and convert the aluminum to insoluble aluminum chloride and maintaining the hydrochloric acid concentration in the leach liquor at at least 36 weight per cent by the injection of hydrochloric acid gas. The insoluble aluminum chloride is then separated from the dissolved impurities and subjected to a second leaching step to solubilize and separate it from the silica gangue. Substantially pure AlCl3.6H2O crystals are recovered from solution and converted to alumina by conventional means. In an alternate embodiment, the process may be practiced on uncalcined clay and includes the addition of a source of fluoride ions, such as H2SiF6, to the at least 36 weight per cent hydrochloric acid leach liquor. An optional preleaching step using 2N to 6N mineral acid is also disclosed.

PB80-127582 PC **A06**/MF **A01**
Iowa State Univ., Ames. Engineering Research Inst.
Scale Up Study on Several Enzymatic Processes for Industrial Application.
Progress rept.,
Peter J. Reilly. Jun 76, 108p ISU-ERI-AMES-76330, NSF/RA-761818
Grant NSF-APR73-07783
See also report dated Dec 76, PB-266 648.

Continuing studies on enzymatic processes for use in industry are presented. Developments are discussed on the effects of pore diffusion limitation on the products of enzymatic dextrin hydrolysis, and of slow pore diffusion on observed immobilized enzyme stability. The former includes the formulation of a model of dextrin hydrolysis within a porous carrier. Methods are described for the production, purification, immobilization, and characterization of hog kidney mutarotase in an attempt to investigate the properties of immobilized mutarotase. Other studies include a two-step enzyme reaction in a packed bed of immobilized glucoamylase and glucose isomerase; optimization of an immobilized two-enzyme reactor undergoing decay; properties of immobilized beta-amylase; and partial results on the purification and properties of dextransucrase.

PB80-131170 PC **A06**/MF **A01**
Meteorology Research, Inc., Altadena, CA.
Ceilcote Ionizing Wet Scrubber Evaluation.
Final rept. Sep 78-Sep 79,
David S. Ensor. Nov 79, 122p EPA-600/7-79-246
Contract EPA-68-02-2125

The report gives results of an evaluation of a Ceilcote ionizing wet scrubber installed on a refractory brick kiln. Tests involved particulate mass emission, particle size distribution, and opacity. Overall efficiency was 93% with an average outlet opacity determined with a heated plant process visiometer (PPV) of 8% over a 1.68 m (5.5 ft) path length. The average particle cut diameter of the scrubber system was 0.5 micrometer. The estimated theoretical power requirement for the ionizing wet scrubber was 41 W/actual cu m (1.54 hp/1000 actual cu m). The scrubber system developed for the kiln included a cooling tower to provide chilled water for the prescrubber to condense volatile emissions which required 26 W/actual cu m (2.5hp/1000 acfm). The performance of the ionizing wet scrubber, based on theoretical power input, exceeds that of a venturi scrubber.

PB80-132657 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
Hydrodynamic and Heat Transfer Effects in a Packed Bed Melter-Condenser.
Master's thesis,
W. L. Sifleet. Jan 75, 31p W80-02609, OWRT-3268(3)
Contract DI-14-20-3268

Data are presented on liquid-phase hold-up and on heat transfer for geometries similar to those which are likely to be employed in a packed bed melter-condenser for use in secondary refrigerant freezing desalination. Hold-up was studied in a string-of-spheres column for water, for aqueous sucrose solutions, and for suspensions of polyethylene particles in water. The data for water and for sucrose solutions show excellent agreement with a new theory which has been developed for this purpose. Rather surprisingly, the suspensions of polyethylene behaved exactly as did water alone. Heat transfer rates were studied for the condensation of n-butane upon a film of cold water which was caused to flow over a single sphere. The results are in satisfactory agreement with simple penetration.

PB80-132806 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemical Engineering and Applied Chemistry.
Coupled Enzyme-Hollow Fiber Systems.
Rept. no. 2 (Final), 1 Feb 72-30 Jun 76,
H. P. Gregor, P. W. Rauf, L. Weinberger, L. L. Jacobson, and S. Mizrahi. 1 Oct 76, 14p NSF/RA-761812
Grant NSF-APR75-02310

This report briefly describes research on devising a stabilized enzyme system of increased capacity and rate of conversion in order to be applicable to industrial processes, employing enzymes coupled by chemical bonds to the inner pore surfaces of membranes under pressure-driven conditions, and passing the feed stream into the reactor under pressure. Membranes were cast which had pores about 3-5 times the size of the enzymes. Then these pores were lined with coupled enzyme;

under pressure-driven conditions an exquisite control of conditions was effected and high capacities and high activities were obtained. When substrate (or feed) was passed in, these enzyme reactors achieved a rate of conversion beyond even that of the native enzyme.

PB80-148364 MF **A01**
Exxon Research and Engineering Co., Linden, NJ.
Regenerable Sorbents for Fluidized Bed Combustion.
Quarterly Progress rept. 1 Oct-31 Dec 76,
L. A. Ruth, and G. M. Varga, Jr. 1976, 37p NSF/RA-761784
Grant NSF-AER75-16194
See also report dated Apr 77, PB-293 037.
Available in microfiche only because of poor quality.

Superior sorbents which can be used to remove sulfur compounds from burning coal in a cost-effective manner are investigated. Candidate sorbents are those which have been projected by thermodynamics to be of potential interest. Investigation of the performance during cycling of sorbents in powdered form was continued during the period reported and work was begun on cycling sorbents in the form of pellets. New samples of powdered BaTiO3 were examined in order to determine the reason for the superior performance of the original sample obtained from Alfa. High and low sodium forms of the material with the empirical formula (CaO)3Al2O3 were cycled. Combinations of CaO and calcium aluminate cement continue to be promising sorbents. Grove limestone and Pfizer dolomite powders and pellets were cycled to determine the effect of particle size on sulfation rate.

7B. Inorganic Chemistry

PATENT-4 185 081 Not available NTIS
Department of the Air Force Washington DC
Procedure for the Synthesis of Stoichiometric Proportioned Indium Phosphide.
Patent,
Thomas A. Fauth, and Joseph A. Adamski. Filed 31 Jul 78, patented 22 Jan 80, 6p AD-D006 843/7, PAT-APPL-929 470
Supersedes PAT-APPL-929 470-78, AD-D005 288.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for synthesizing indium phosphide that avoids the explosion problem which often occurs in the synthesis procedures which use the direct reaction of elemental phosphorus and elemental indium to produce indium phosphide. The method utilizes specific heating, pressurizing and cooling parameters to safely produce highly pure, stoichiometric, polycrystalline indium phosphide. (Author)

7C. Organic Chemistry

AD-A079 985/8 PC **A05**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Basic Studies Relative to the Syntheses of Unsymmetrical Dimethylhydrazine and Monomethylhydrazine by Chloramination.
Final rept. 1 Sep 75-30 Sep 79,
Harry H. Sisler. 7 Dec 79, 99p AFOSR-TR-80-0031
Grant AFOSR-76-2915

The reactions of chloramine with appropriate nitrogen bases to form unsymmetrical dimethylhydrazine or monomethylhydrazine were examined. Various by-products were identified and mechanisms proposed. Processes for the synthesis of both of these hydrazines were developed. The oxidation of unsymmetrical dimethylhydrazine by gaseous oxygen was studied and the various products identified. The oxidation of monomethylhydrazine was also investigated. The oxidation of unsymmetrical dimethylhydrazine by mercuric oxide was also studied. (Author)

PAT-APPL-6-078 402 PC **A02**/MF **A01**
Department of the Navy Washington DC
Mono-Substituted Phthalonitriles and Phthalocyanines.
Patent Application,
Teddy M. Keller, and James R. Griffith. Filed 24 Sep 79, 11p AD-D006 817/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Iodophthalonitrile is prepared by mixing aminophthalonitrile with sulfuric acid at a temperature below 25 C, reacting that product with sodium nitrite at a temperature below 15 C, and reacting that product with potassium iodide at a temperature below 20 C. A fluoroalkyl phthalonitrile is prepared by mixing fluoroalkyl iodide, activated copper, iodophthalonitrile, and a solvent under an inert atmosphere at a temperature from 110 C to 125 C at least until the solution turns green. Both compounds are useful in synthesizing phthalocyanines and polyphthalocyanines. (Author)

PAT-APPL-6-100 301 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Fluorine-Containing Benzimidazoles.
Patent Application,
Christ Tamborski. Filed 4 Dec 79, 9p AD-D006 886/6
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to benzimidazoles which are substituted in the 2-position with perfluoroalkyleneether groups.

PATENT-4 173 591 Not available NTIS
Department of the Navy Washington DC
Process for the Preparation of 1,3,5-Trifluoro-2,4,6-Trinitrobenzene.
Patent,
William M. Koppes, Horst G. Adolph, and Michael E. Sitzmann. Filed 28 Aug 78, patented 6 Nov 79, 3p AD-D006 868/4, PAT-APPL-937 281
Supersedes PAT-APPL-937 281-78, AD-D005 429.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process for producing 1,3,5-trifluoro-2,4,6-trinitrobenzene by: (1) forming a mixture of fuming sulfuric acid and potassium nitrate wherein the fuming sulfuric acid is composed of at least 25 percent by weight sulfur trioxide, and wherein the molar ratio of fuming sulfuric acid to potassium nitrate is from about 2:1 to about 3:1; (2) adding 1,3,5-trifluorobenzene to the mixture until the molar ratio of potassium nitrate to 1,3,5-trifluorobenzene is from 6:1 to 10:1, the temperature of the mixture being maintained in the range of from about 30 degrees C. to about 50 degrees C. during the addition; (3) then raising the temperature of the mixture into the range of from about 140 degrees C. to about 160 degrees C. where it is maintained until the optimum yield of 1,3,5-trifluoro-2,4,6-trinitrobenzene has been obtained; and (4) isolating the product, 1,3,5-trifluoro-2,4,6-trinitrobenzene from the reaction mixture. (Author)

PATENT-4 179 446 Not available NTIS
Department of Agriculture, Washington, DC.
Sex Pheromone Produced by the Female Japanese Beetle: Specificity of Male Response to Enantiomers.
Patent,
James H. Tumlinson, III, Michael G. Klein, Robert E. Doolittle, and Thyril L. Ladd, Jr. Filed 8 Aug 78, patented 18 Dec 79, 6p PB80-137292, PAT-APPL-932 079
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discusses (Z)-5-(1-decenyl)dihydro-2(3H)-furanone, isolated from virgin female Japanese beetles, Popilla japonica, attracted males of the species in field bioassays. However, the synthesized racemic mixture of this compound did not attract male Japanese beetles. The Z- and E-isomers and the saturated analog of both enantiomers of this compound were synthesized stereospecifically. Pure synthetic (R,Z)-5-(1-decenyl)dihydro-2(3H)-furanone was competitive with live females and with the pheromone isolated from live females in attracting males. Male response was strongly inhibited by small amounts of the (S,Z)-isomer.

PATENT-4 180 628 Not available NTIS
Department of the Interior, Washington, DC.
Resin for Sorption of Tungsten.
Patent,
Wayne N. Marchant, and Parkman T. Brooks.
Filed 18 Jul 78, patented 25 Dec 79, 5p PB80-139223, PAT-APPL-925 672
Supersedes PB-288 614.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A resin for sorption of tungsten is prepared by copolymerization of 8-hydroxyquinoline, a polyamine, resorcinol and formaldehyde. The resin finds particular utility for recovery of tungsten from alkaline brines.

PB80-127574 PC **A04**/MF **A01**
FilmTec Corp., Minnetonka, MN.
Advanced Poly(Piperazineamide) Reverse Osmosis Membranes.
Final rept. 27 Sep 78-26 Sep 79,
John E. Cadotte, Rita S. King, and Nancy A. Newkumet. 1979, 54p W80-02401, OWRT-C-80011-S(8512)(1)
Contract DI-14-34-0001-8512

Poly(piperazineamide) thin-film composite reverse osmosis membranes were prepared by interfacially reacting piperazine compounds with a mixture of isophthaloyl and trimesoyl acid chlorides. Reaction of piperazine itself with these acylhalides gave membranes with high flux and excellent salt rejections towards salts with divalent anions, but relatively poor salt rejections toward salts with monovalent anions. About 95% seawater rejections were possible. A variety of water-soluble, amine-terminated piperazine oligomers were prepared by reaction of an excess of piperazine with poly-functional acyl halides. These were then used in the above interfacial reaction step. Cyanuric chloride-piperazine adducts showed performance advantages over other in preparation of reverse osmosis membranes interfacially. In seawater tests at 1000 psi and 25C, fluxes of 15 to 20 gfd at 97 percent salt rejection were attainable for poly(piperazineamides) containing cyanuric amide segments. These latter membranes were not chlorine-resistant.

PB80-128168 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Assessing the Environmental Impact of Fossil-Fuel Based Energy Sources: Measurement of Organometal Species in Biological and Water Samples Using Liquid Chromatography with Electrochemical Detection.
Interim rept. Oct 76-May 78,
William A. MacCrehan, and Richard A. Durst.
Nov 79, 67p EPA-600/7-79-211

A new measurement approach for the determination of trace organometals in energy related environmental samples is described. The method is based on liquid chromatographic separation with electrochemical detection. A detailed description of the development of the electrochemical detection system, optimized for reducible analytes, is given. The conditions for the separation of methyl-, ethyl-, and phenylmercury in under 16 minutes by charge-neutralization reverse-phase chromatography are developed. Also, a separation of a number of organoleads, including trimethyl- and triethyllead, are described. The potential interferences in this type of organometal determination are investigated. Sample preparation methods and improvement in the detector selectivity are described that overcome these interferences. A significant improvement in the selectivity of the detection system has been investigated using a differential pulse waveform. Sample preparation methods for the determination of methylmercury in biological tissue are examined and measurements are made on two research materials: lyophilized tuna and shark meat. A column preconcentration procedure for methyl- and ethylmercury in natural water samples is developed.

7D. Physical Chemistry

AD-A079 570/8 PC **A02**/MF **A01**
IRT Corp San Diego CA
Composition of Partially Metastable Kr Beams,
R. H. Neynaber, and S. Y. Tang. 7 May 79, 4p
IRT-8173-007, AFOSR-TR-79-1295
Contract F49620-78-C-0015
Pub. in Chemical Physics Letters, v65 n1 p150-152, 1 Aug 79.

No abstract available.

AD-A079 578/1 PC **A02**/MF **A01**
National Bureau of Standards Washington DC Quantum Chemistry Group
The (5 pi sub u)-(5 sigma sub g) plus Transition in N2,
M. Krauss, and D. B. Neumann. 13 Mar 78, 13p
AFOSR-TR-79-1298
Grant AFOSR-ISSA-77-0011
Pub. in Molecular Physics, v37 n6 p1661-1671 1979.

No abstract available.

AD-A079 613/6 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Aerophysics Lab
O2 (1 Delta)-I Atom Kinetic Studies.
Interim rept.,
Raymond F. Heidner, III, and Carrol E. Gardner. 8 Nov 79, 41p TR-0080(5606)-2, SD-TR-79-6
Contract F04701-79-C-0080

A discharge flow system has been used to refine kinetic rate measurements for the O2(1 sub delta) + I energy-pooling process and for the iodine-catalyzed removal of O2(1 sub delta). Particular attention was given the effects of I2-carrier gas (Ar) on the emission intensity of O2(1 sub delta) and O2(1 sub sigma). A heated I2 saturator and a saturator bypass technique were developed to minimize such effects. The data reported here indicate that processes proportional to (O2(I sub delta)) to the 2nd power are important at (O2(1 sub delta)) and (I) densities, which are appropriate for a cw O2(1 sub delta)-I atom transfer laser.

AD-A079 643/3 PC **A04**/MF **A01**
Catholic Univ of America Washington DC Dept of Physics
Electronic Stopping Power Calculations for all Heavy Ions at Low Velocity in All Elements.
Technical rept.,
J. G. Brennan, and D. J. Land. Jan 80, 60p Rept no. TR-2
Contract N00014-78-C-0515

Values of the electronic stopping power for projectiles from carbon to uranium in elemental targets from hydrogen through the transuranic elements at the Bohr velocity, v sub zero = (e to the 2nd power)/h-bar, are presented in sets of tables. The stopping powers were calculated within a modified Firsov model. An algorithm for determing the stopping power from v = 0 to v = 3 to 4 v sub zero is discussed. The stopping powers, as obtained from this algorithm, are compared with an extensive collection of experimental data. The results are presented in a series of graphs. (Author)

AD-A079 644/1 PC **A02**/MF **A01**
Boston Coll Chestnut Hill MA Dept of Chemistry
Catalytic Oxidation of Phosphines by Transition Metal-Activated Carbon Dioxide.
Interim rept.,
Kenneth M. Nicholas. 19 Nov 79, 6p Rept no. TR-1

The complexes (Ph3P) 3RhCl and (cyclooctene) 2RhCl 2 have been found to catalyze the oxidation of phosphines by carbon dioxide in refluxing decalin. The rate of oxidation increases in the order PPh3 less than PBuPh2 less than PEt3. (Author)

AD-A079 706/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Boltzmann Equation with a Soft Potential. Part I. Linear, Spatially-Homogeneous.
Technical summary rept.,
Russel Caflisch. Oct 79, 43p Rept no. MRC-TSR-2005
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525
Sponsored in part by grant NSF-MCS76-07039.

The Boltzmann equation describes the evolution of a large system of particles. The configuration of particles changes due to the motion of the particles and the collisions of particles. The collisions proceed according to the force law between particles. The 'soft' forces considered here are ones for which the total effect of collisions is smaller for a particle of higher energy. If the system is close to equilibrium, then its evolution can be described approximately by linear equations. In this paper the linear Boltzmann equation with a soft potential is solved for all time. Previously only 'hard' potentials had been considered. (Author)

AD-A079 742/3 PC **A03**/MF **A01**
Missouri Univ-Rolla Dept of Physics
Coherence in Penning Ionization and First Kind Collisions: Volume Recombination of Ions/Electrons.
Technical rept. no. 12, Dec 78-Dec 79,
L. D. Schearer, and W. F. Parks. 1 Dec 79, 28p
Contract N00014-75-C-0477

A thermal energy beam of helium atoms in the metastable state is used to coherently excite ions of Sr, Ca, and Ba in a Penning collision. The anisotropic excited state distributions appears as Polarized line emission from the excited ions. The degree of ion alignment may be used to determine the populations of the quasi-molecular states of the ion-atom pair. The coherent emission is also utilized to obtain Hanle signals from which the radiative decay rate of the excited ion is determined. This is the first case in which coherence is produced in a collision process involving Penning ionization. The alignment of the Penning ions is an important new parameter in the description of these reactions. In an effort to extend such observations to molecular systems a nitrogen molecular metastable beam source was demonstrated. The use of metal vapor targets and the excitation rate of the excited states of Cd and Zn in energy transfer collisions with the N2(m) enable us to determine the vibrational distribution of the A 3Sigma state of N2 in the beam. Energy transfer cross sections and some Penning cross sections were measured in the beam system. (Author)

AD-A079 764/7 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Acridine Araphanes: A New Class of Probe Molecules for Biological Systems.
Medical research progress rept.,
Chester M. Himel, Jeffrey L. Taylor, Courtney Pape, David B. Millar, and John Christopher. 7 May 79, 4p Rept no. NMRI-79-69
Pub. in Science, v205 p1277-1279, 21 Sep 79.

No abstract available.

AD-A079 814/0 PC **A02**/MF **A01**
Michigan State Univ East Lansing Dept of Chemistry
Photoionization Studies of Molecular Dynamics and Energetics.
Final technical rept. 15 Sep 75-14 Dec 78,
G. E. Leroi. Jul 79, 5p
Contract N00014-76-C-0434

The primary scientific accomplishment during the contractual period was the completion of a sophisticated, computer-controlled photoionization mass spectrometric instrument which was designed in our laboratory. Photoionization efficiency curves for parent and daughter ions of the chlorofluoromethanes, of acetonitrile and perdeuteroacetonitrile, and preliminary curves for several other molecules of aeronomical interest, were obtained. The potentiality of the instrumentation to study ion-molecule reactions was also successfully explored.

AD-A079 825/6 PC **A02**/MF **A01**
SRI International Menlo Park CA Chemical Kinetics Dept
Infrared Multiphoton Dissociation Yields via a Versatile New Technique: Intensity, Fluence, and Wavelength Dependence for CF sub 3I,
Michel Rossi, John R. Barker, and David M. Golden. 30 May 79, 5p AFOSR-TR-79-1349
Contract F49620-78-C-0107
Pub. in Chemical Physics Letters, v65 n3 p523-526, 1 Sep 79.

No abstract available.

AD-A079 826/4 PC **A02**/MF **A01**
SRI International Menlo Park CA Chemical Kinetics Dept
Absolute Rate Constants for Metathesis Reactions of Allyl and Benzyl Radicals with HI(DI). Heat of Formation of Allyl and Benzyl Radicals,
M. Rossi, and D. M. Golden. 4 May 78, 7p
AFOSR-TR-79-1350
Contract F44620-75-C-0067
Pub. in Jnl. of the American Chemical Society, v101 n5 p1230-1235 1979.

No abstract available.

AD-A079 827/2 PC **A02**/MF **A01**
SRI International Menlo Park CA Chemical Kinetics Dept
The Equilibrium Constant and Rate Constant for Allyl Radical Recombination in the Gas Phase,
M. Rossi, K. D. King, and D. M. Golden. 4 May 78, 9p AFOSR-TR-79-1354
Contract F44620-75-C-0067
Pub. in the Jnl. of the American Chemical Society, v101 n5 p1223-1230 1979.

No abstract available.

AD-A079 828/0 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Comparison Study of Four Atomic Spectrometric Methods for the Determination of Metallic Constituents in Orange Juice,
J. A. McHard, S. J. Foulk, S. Nikdel, A. H. Ullman, and B. D. Pollard. 7 Feb 79, 6p AFOSR-TR-79-1342
Contract F44620-76-C-0005
Pub. in Analytical Chemistry, v51 n11 p1613-1616 Sep 79.

No abstract available.

AD-A079 829/8 PC **A02**/MF **A01**
SRI International Menlo Park CA Chemical Kinetics Dept
Infrared Multiphoton Chemistry: Comparison of Theory and Experiment; Solution of the Master Equation,
A. C. Baldwin, J. R. Barker, D. M. Golden, R. Duperrex, and H. Van Den Bergh. 27 Nov 78, 4p AFOSR-TR-79-1348
Contract F49620-78-C-0107
Pub. in Chemical Physics Letters, v62 n1 p178-180, 15 Mar 79.

No abstract available.

AD-A079 863/7 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Single Pulse Shock Tube Study of Pyrolysis of Monomethylamine.
Master's thesis,
William Ritter Nusz, Jr. Dec 79, 65p Rept no. AFIT/GA/AA/80M-4

The decomposition of monomethylamine (MMA) was studied to model the decomposition mechanism. The decomposition of a 2.5% mixture of MMA in argon was studied behind a reflected shock by use of a single pulse shock tube with gas chromatography of the products CH4, NH3, and unreacted MMA. The temperatures behind the reflected shock ranged from 727 /degrees K to 1436 degrees K. The reaction test time was 900 microsec. Total pressure ranged from 2.2 atm to 8.03 atm. The rate constants for the initiating C-N bond scissure were determined by a parametric study using a numerical model. The concentrations of CH4, NH3, and MMA were examined to determine the reasonableness of the model. (Author)

AD-A079 882/7 PC **A02**/MF **A01**
Defence Research Establishment Suffield Ralston (Alberta)
A Chromatograph Injection Valve - An Apparatus for Rapid Insertion of Miniature Glass Samplers into the Carrier Gas Flow of a Gas Chromatograph.
Technical note,

W. J. Fenrick, and W. C. Carpenter. Dec 79, 20p Rept no. DRES-TN-402

An injection valve for the rapid insertion of miniature glass samplers into the column of a gas chromatograph has been designed and tested. The valve is constructed so that the carrier gas can be allowed to bypass the injection system and flow directly into the column or it can be diverted through a glass sampler tube where it entrains desorbed vapours and carries them into the chromatograph column. Diversion of the carrier gas is so rapid that the operational stability of the gas chromatograph is not affected. A description and general assembly drawing of the unit, together with experimental evidence of its performance, are presented. (Author)

AD-A079 898/3 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Effects of High Pressure on Molecular Electronic Spectra. II. Morse-Potential Formulation.
Technical rept.,
Robert C. Tompkins. Nov 79, 20p ARBRL-TR-02202, AD-E430 346

The effects of high pressure on electronic spectra are treated on the basis of a Morse potential by a method analogous to that used in deriving the well-known Drickamer model. Expressions are presented for evaluating configuration-coordinate parameters for spectroscopic data. (Author)

AD-A079 953/6 PC **A03**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
Performance of a Gel Permeation Chromatograph and its Usefulness in Examining Mixtures of Organic Materials,
Ivan Grabovac, and Carolyn E. M. Morris. Jan 79, 34p Rept no. MRL-R-725

As part of a programme of assessing the molecular properties of organic materials of defence interest, the performance of a locally designed gel permeation chromatograph fitted with a refractive index (R.I.) detector and an evaporative analyser (E.A.) detector has been examined. It was found that with the R.I. detector the performance is similar to that of other instruments. The resoponse of the E.A. detector was found to depend on a number of operating conditions in an unforeseen manner which limits the usefulness of this detector. However, molecular weight distributions determined with the E.A. detector showed good agreement with the R.I. results. Using the two detectors simultaneously, a study has been made of a complex mixture of epoxy resins (an aircraft adhesive) and it has been shown that information relevant to the performance of advanced organic materials can be provided by such studies. (Author)

AD-A079 998/1 MF **A01**
Naval Research Lab Washington DC
A Study of the Sodium-Hydrogen-Oxygen System.
Memorandum rept.,
Dale D. Williams. Jun 52, 29p Rept no. NRL-MR-33
Availability: Microfiche copies only.

The sodium-hydrogen-oxygen system has been investigated in continuation of the study of impurities in liquid metals. Sodium metal reacts with sodium hydroxide at temperatures above 300 degrees C to form sodium monoxide and sodium hydride. If the reaction is initiated in vacuo, hydrogen will be liberated to the extent of the dissociation pressure of sodium hydride at temperatures below 385 degrees C. If this hydrogen is not removed from the reaction zone, and if the temperature is raised beyond 385 degrees C, an equilibrium is established which does not follow the dissociation pressure diagram for sodium hydride. This new equilibrium appears to be related to the solubility of the reaction products in sodium metal and in sodium hydroxide. The 'keystone' of the equilibrium appears to be the fusion temperature of the melt which, in turn, is determined principally by the ratio of sodium monoxide to sodium hydroxide. Data are presented showing that the dissociation of sodium hydride is suppressed by an inert gas blanket. It is indicated that sodium hydride must vaporize or sublime before it will dissociate. It is further shown that sodium hydride in solution is quite stable, even in vacuo at temperatures well above those at which the hydride should be dissociated. Data for the potassium-hydrogen-oxygen system are entirely different from that reported for the corresponding sodium system. The difference could well be related to a higher solubility of the reaction products in the reactants.(Author)

AD-A080 049/0 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center Watertown MA
Study of the Melting Behavior of YAG Single Crystal by Optical Differential Thermal Analysis.
Final rept.,
Jaroslav L. Caslavsky, and Dennis J. Viechnicki. Nov 79, 21p Rept no. AMMRC-TR-79-56

The melting point of yttrium aluminum garnet (YAG), reinvestigated by optical differential thermal analysis (ODTA), was found to be 1940 + or - 7 C. Above this temperature YAG liquids are opaque, suggesting the presence of two immiscible liquids. In the composition range 10.0 to 47.5 mol. % Y2O3, crystallization of the equilibrium phases can only occur in the presence of YAG nuclei; otherwise solidification of YAlO3 and Al2O3 will take place. A metastable phase diagram has been defined with a metastable eutectic at 23 mol. % Y2O3 - 77 mol. % Al2O3 and 1702 + or - 7 C. YAlO3 (perovskite) was found to melt incongruently with a peritectic temperature of 1916 + or - 7 C and a liquidus temperature of 1934 + or - 7 C. YAlO3 formed during metastable solidification transforms to YAG in the presence of Al2O3 at 1418 + or - 7 C. It is suggested that the metastability arises from the difficulty of the aluminum to attain fourfold coordination in the YAG structure. (Author)

AD-A080 070/6 PC **A03**/MF **A01**
United Technologies Research Center East Hartford CT
Rotational Population Transfer in DF.
Final rept. 1 Feb-30 Sep 79,
J. J. Hinchen, and R. H. Hobbs. 31 Dec 79, 47p UTRC/R79-954560, AFOSR-TR-80-0057
Contract F49620-79-C-0032

Collisional transfer of population between rotational levels of DF was measured using an i r double resonance method. The data were used to calculate rotational rates. Pressure broadening of DF absorption was determined for the fundamental lines P6 through P18. Total molecular collisional rates were obtained from the absorption data and compared with the total of individual collisional rates for velocity, vibrational and rotational relaxation. The results were compared with two kinetic rate models. Observation were also made of rotational lasing and vibration to rotation transfer in DF. (Author)

AD-A080 087/0 PC **A02**/MF **A01**
California Inst of Tech Pasadena Arthur Amos Noyes Lab of Chemical Physics
Proceedings of the Asilomar Conference on Electron-Molecule and Photon-Molecule Collisions (1st) Held on 1-4 August 1978 at Pacific Grove, California.
Final rept. 1 Jul 78-30 Jun 79,
Thomas Rescigno, Vincent McKoy, and Barry Schneider. 27 Jul 79, 12p 78-01073, AFOSR-TR-80-0015
Grant AFOSR-78-3682
Prepared in cooperation with California Univ., Livermore. Lawrence Livermore Lab. and Los Alamos Scientific Lab., NM.

The First Asilomar Conference on Electron- and Photon-Molecule Collisions was held August 1-4, 1978 in Pacific Grove, California. This meeting brought together forty scientists who are actively involved in theoretical studies of electron scattering by, and photoionization of, small molecules. In the volume are collected the contributions of the invited speakers, as well as the roundtable and evening discussions condensed from taped recordings of the entire proceedings. The subject matter reflects current activity in the field and describes many of the techniques that are being developed and applied to molecular collision problems. (Author)

AD-A080 090/4 PC **A02**/MF **A01**
Vermont Univ Burlington Dept of Chemistry
Organophosphazenes. XIII. Reactions of Hexafluorocyclotriphosphazene with p-N,N-Dimethylaminophenyl Lithium and Grignard Reagents.
Technical rept.,
Christopher W. Allen, and Peter L. Toch. 3 Jan 80, 24p Rept no. TR-5
Contract N00014-77-C-0605
See also AD-A080 091.

The reactions of p-dimethylaminophenyl Grignard and lithium reagents with hexafluorocyclotriphosphazene have been examined. These reactions yield the p-dimethylaminophenyl substituted cyclophosphazenes, in moderate to poor yields with the Grignard reagent giving the better yields. The reaction follows a non-geminal pathway giving an approximately equimolar mixture of cis and trans isomers at the disubstituted stage. In a 6:1 molar reaction of the Grignard reagent with P3N3F6, ring degradation appears to be the predominant mode of reaction with the trans - 2,4,6-P3N3F3(C6H4N(CH3)2)3 moiety being the only isolable cyclophosphazene.

AD-A080 091/2 PC **A02**/MF **A01**
Vermont Univ Burlington Dept of Chemistry
Organophosphazenes. XIV. Para Substituted Aryl and Mixed Para Substituted Aryl/Phenyl Fluorocyclotriphosphazene Derivatives.
Technical rept.,
Christopher W. Allen, George E. Brunst, and Michael E. Perlman. 15 Jan 80, 21p Rept no. TR-6
Contract N00014-77-C-0605
See also AD-A075 218.

The reactions of aryl lithium reagents containing electron donating substituents in the para position with hexafluorocyclotriphosphazene, P3N3F6, have been examined. These reactions yield the appropriate monoaryl pentafluorocyclotriphosphazenes in moderate yields. The monoaryl phosphazenes are converted to the geminally substituted mixed aryl/phenyl derivatives by the Friedel-Crafts reaction. The infrared and nmr spectroscopic data along with the mass spectrometry data are discussed in terms of perturbations of the aryl system by both the phosphazene and electron donor substituents.

AD-B006 121/8 PC **A04**/MF **A01**
Air Force Armament Lab Eglin AFB Fla
Effect of Mixture Ratio on UV, Visible and Infrared Radiation from Exhaust Plumes.
Final rept. 1 Jul 74-1 May 75,
D. B. Ebeoglu, and C. W. Martin. May 75, 64p Rept no. AFATL-TR-75-79
Distribution limitation now removed.

The development of infrared plume generators for aerial targets with the design goals of approximating threat aircraft/missile signatures required the identification of major physical and chemical parameters which affect the radiation characteristics (spectral and spatial intensity) of jet aircraft and missile exhaust plumes. Investigations have been carried out to determine the spectral distributions of general hydrocarbon exhaust and combustion between 0.3 and 14 microns. Gaseous, liquid and solid propellants, including pyrophorics, have been studied in the laboratory at static altitudes up to 18.3 kilometers (60,000 feet). The data show all hydrocarbons to have common major radiating species. In the infrared, the predominant radiating species at any oxidizer to fuel (O/F) ratio are always CO2 and H2O. In the ultraviolet and visible, the radicals of C2, CH, and OH are the primary contributors to radiation from low O/F ratios to beyond stoichiometry. Band radiation at high mixture ratios is mainly due to OH. C3 radiation is apparent at very fuel-rich conditions, although continuum, or graybody radiation, is the primary emission mode. One major parameter, O/F ratio, has been found to be the dominant factor affecting radiation at any wavelength. The data indicate propellant chemistry to have a relatively minor effect on infrared radiation levels.

N80-16117/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Trends in Materials' Outgassing Technology.
J. A. Colony. Nov 79, 27p NASA-TM-80585

Test sample acquisition and chemical analysis techniques for outgassing products from spacecraft, experiment modules, and support equipment is described. The reduction of test data to a computer compatible format to implement materials selection policies is described. A list of the most troublesome outgassing species is given and several materials correlations are discussed. Outgassing from solar panels, thermal blankets, and wire insulation are examined individually.

N80-16232/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Homogeneous Alignment of Nematic Liquid Crystals by Ion Beam Etched Surfaces.
E. G. Wintucky, R. Mahmood, and D. L. Johnson. 19 Oct 79, 19p NASA-TM-81378, E-283
Conf-Presented at 156TH Meeting of the Electrochem. Soc., Los Angeles, 15-19 Oct. 1979.

A wide range of ion beam etch parameters capable of producing uniform homogeneous alignment of nematic liquid crystals on SiO2 films are discussed. The alignment surfaces were generated by obliquely incident (angles of 5 to 25 deg) argon ions with energies in the range of 0.5 to 2.0 KeV, ion current densities of 0.1 to 0.6 mA sq cm and etch times of 1 to 9 min. A smaller range of ion beam parameters (2.0 KeV, 0.2 mA sq cm, 5 to 10 deg and 1 to 5 min.) were also investigated with ZrO2 films and found suitable for homogeneous alignment. Extinction ratios were very high (1000), twist angles were small (or = 3 deg) and tilt-bias angles very small (or = 1 deg). Preliminary scanning electron microscopy results indicate a parallel oriented surface structure on the ion beam etched surfaces which may determine alignment.

N80-16882/6 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
A Twin Optically-Pumped Far-Infrared CH3OH Laser for Plasma Diagnostics.
M. Yamanaka, Y. Takeda, S. Tanigawa, A. Nishizawa, and N. Noda. Nov 79, 35p IPPJ-428

A twin optically-pumped FIR CH3OH laser composed of two identical waveguide resonators was constructed for the modulated interferometer system to be applied to the JIPP T-2 Tokamak machine. The anti-symmetric doublet due to the Raman-type resonant two-photon transition is reproducibly observed at 118.8 micron m. With the 118.8-micron m line, the frequency separation of the anti-symmetric doublet indicates that the CH3OH absorption line center is 16 + or - 1 MHz higher than the pump 9.7-micron P(36) CO2 laser line center. It is shown that the Raman-type resonant two-photon transition is useful in getting several-MHz phase modulations for the far-infrared laser interferometer. Some preliminary performances of this twin laser for the modulated interferometer are described.

PAT-APPL-6-080 824 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Recovery of Alumina from Clay.
Patent Application,
Judith A. Eisele, Donald J. Bauer, and Paul R. Bremner. Filed 1 Oct 79, 7p PB80-139405
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Off-gases from thermal decomposition of hydrated aluminum salts are used in leaching of clays to recover alumina.

PATENT-4 170 706 Not available NTIS
Department of the Navy Washington DC
Method for Preparing the Bispicrate Salt of 2,3,7,8-Tetraazaspiro(4.4)Nonane.
Patent,
Arnold T. Nielsen. Filed 28 Aug 78, patented 9 Oct 79, 5p AD-D006 863/5, PAT-APPL-937 635
Supersedes PAT-APPL-937 635-78, AD-D005 788.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns synthetic routes to 2,3,7,8-tetraazaspiro(4.4)nonane, its bispicrate salt, 2,3,7,8-tetraazaspiro(4.4)nona-2,7-diene, and 3,8-dicarbomethoxy-2,3,7,8-tetraazaspiro(4.4)nona-1,6-diene. The compounds are useful as high density fuels.

PATENT-4 170 707 Not available NTIS
Department of the Navy Washington DC
Method for Preparing 3,8-Dicarbomethoxy-2,3,7,8-Tetraazaspiro(4.4)nona-1,6-diene.
Patent,
Arnold T. Nielsen. Filed 28 Aug 78, patented 9 Oct 79, 5p AD-D006 864/3, PAT-APPL-937 634
Supersedes PAT-APPL-937 634-78, AD-D005 787.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Synthetic routes to 2,3,7,8-tetraazaspiro(4.4)nonane, its bispicrate salt, 2,3,7,8-tetraazaspiro(4.4)nona-2,7-diene, and 3,8-dicarbomethoxy-2,3,7,8-tetraazaspiro(4.4)nona-1,6-diene. The compounds are useful as high density fuels. (Author)

PATENT-4 181 588 Not available NTIS
Department of the Interior, Washington, DC.
Method of Recovering Lead through the Direct Reduction of Lead Chloride by Aqueous Electrolysis.
Patent,
Morton M. Wong, and Frank P. Haver. Filed 4 Jan 79, patented 1 Jan 80, 6p PB80-139157, PAT-APPL-6-001 026
Supersedes PB-296 758.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is given for recovering lead from lead chloride through aqueous electrolysis wherein the lead chloride is directly reduced to metallic lead on the cathode. The electrolyte may comprise liquor from the leaching of galena concentrates, which liquor includes ferrous chloride that is subsequently converted to ferric chloride during electrolysis and recycled for additional leaching.

PATENT-4 181 630 Not available NTIS
Department of the Interior, Washington, DC.
Catalyst for Synthesis of Methanol.
Patent,
Elizabeth G. Baglin, Gary B. Atkinson, and Larry J. Nicks. Filed 30 Nov 78, patented 1 Jan 80, 3p PB80-139264, PAT-APPL-964 860
Supersedes PB297 617.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A catalyst for synthesis of methanol is prepared from an alloy of copper with a metal from the rare earth or actinide series or group IVB of the periodic table. The alloy is reacted with a gas having sufficient oxidizing power to oxidize the rare earth, actinide or group IVB metal.

PB80-126840 PC **A08**/MF **A01**
California Univ., Riverside. Statewide Air Pollution Research Center.
Chemical Consequences of Air Quality Standards and of Control Implementation Programs: Roles of Hydrocarbons, Oxides of Nitrogen, Oxides of Sulfur and Aged Smog in the Production of Photochemical Oxidant and Aerosol.
Final rept. 24 May 77-30 Sep 78,
James N. Pitts, Jr., Arthur M. Winer, Karen R. Darnall, George J. Doyle, and Richard A. Graham. Jun 79, 167p ARB-R-A6-172-30-79-104

The environmental chamber facility established at the Statewide Air Pollution Research Center, University of California, Riverside, under a joint Air Resources Board--University of California (Project Clean Air) program has been employed in investigations: to establish correlations between ozone formation and hydroxyl radical rate constants and hydrocarbon reactivity scales; to determine rate constants for the reactions of hydroxyl radicals with selected organic compounds including alkanes, alkenes and alkene oxides; to obtain data concerning the rates of conversion of sulfur dioxide to sulfate aerosol under simulated atmospheric conditions; to extend the previous oxidant-HC-NOx data base obtained at SAPRC by generating data for 12 hour irradiation experiments employing both constant light intensity and quasi-diurnal light intensity; to apply both computer kinetic modeling and an empirical mathematical approach to assessments of oxidant-precursor relationships.

PB80-127244 PC **A05**/MF **A01**
Ohio State Univ., Columbus. Water Resources Center.
Adsorption of Free and Complexed Metals from Solution by Activated Carbon,
Alan J. Rubin, and Danny L. Mercer. Aug 79, 76p W80-02406, OWRT-A-044-OHIO(1)

Because of the interest in removing trace elements from water, the effect of two complexing agents of different solubilities on the adsorption of cadmium(II), zinc(II) and lead(II) by activated carbon was investigated. Studies were run to compare carbons of different isoelectric points, particle size and dosage. The Freundlich and Langmuir isotherms were compared as were curve fitting techniques for evaluating the adsorption parameters. At very low surface coverage, as with an excess of adsorbent, EDTA appears to enhance the sorption of cadmium. Under more realistic conditions, that is, at high surface coverages, the effect of this soluble chelating agent is to suppress adsorption of metal ion. Therefore, it was concluded that the use of EDTA is detrimental to metals removal. It can be further concluded that complexation with relatively insoluble chelating agents such 1,10-phenanthroline can significantly promote metals removal by activated carbon. There are several limitations to the Langmuir model for representing equilibrium adsorption data, however, the Freundlich equation is even less successful.

PB80-128150 PC **A03**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Sampling and Analysis of Selected Toxic Substances. Task I: Acrylamide.
Final rept. Sep 78-Sep 79,
John E. Going, and Ken Thomas. Dec 79, 39p
EPA-560/13-79-013
Contract EPA-68-01-5017

A sampling and analysis program was conducted to determine the level of residual acrylamide monomer in selected polymers and to determine if the use of those polymers in water treatment leads to measurable levels of acrylamide in the water. Methods for the determination of acrylamide in water and in polyacrylamide were validated. Water samples were reduced in volume by evaporation and analyzed by GC using a nitrogen selective thermionic detector. The detection limit was determined to be about 1 microgram/liter. Polyacrylamide samples were extracted with 80% methanol/20% pH 3.75 water for 3 hr. The extracts were analyzed by HPLC with a UV detector set at 200 nm. The monomer limit of detection was about 0.5 microgram/g. One potable water treatment plant was sampled at pre- and post-flocculation points. MRI tap water was analyzed for comparison. No acrylamide above the detection limit was found in any of the samples. Thirty-two polymers were analyzed for residual acrylamide. When not obscured by interferences, the observed acrylamide ranged from 0.5 to 600 microgram/g.

PB80-131014 Not available NTIS
National Bureau of Standards, Washington, DC.
Determination of the Triple-Point Temperature of Gallium.
Final rept.
1979, 15p
Pub. in Metrologia 15, n4, p201-215 1979.

The triple-point temperature of high-purity gallium has been determined to be 29.77406 degrees C using three standard platinum resistance thermometers calibrated on the IPTS-68 and using samples of gallium from three commercial sources.

PB80-131048 Not available NTIS
National Bureau of Standards, Washington, DC.
Correlation of the Glass Transition and the Pressure Dependence of Viscosity in Liquids.
Final rept.,

R. G. Munro, S. Block, and G. J. Piermarini. Nov 79, 5p
Pub. in Jnl. of Applied Physics 50, n11, p6779-6783, Nov 79.

The determination of the glass-transition pressure by the ruby R1 line-broadening method is quantitatively confirmed to within 10% by an independent method. The procedure uses a model which describes the pressure dependence of the viscosity and contains the glass-transition pressure as a parameter. The two methods are compared for three liquids, n-butyl chloride, 4:1 methanol-ethanol, and isopropyl alcohol. Data from earlier works are used for 4:1 methanol-ethanol and isopropyl alcohol. The viscosity of n-butyl chloride at room temperature is measured as a function of pressure to 36 kbars in a diamond-anvil falling-sphere viscometer, and the glass-transition pressure is determined by a separate measurement using the ruby R1 line-broadening method.

PB80-131057 Not available NTIS
National Bureau of Standards, Washington, DC.
Radiance Temperature (at 653 nm) of Palladium at its Melting Point.
Final rept.,
A. P. Miller, and A. Cezairliyan. 1979, 7p
Pub. in High Temperature Science 11, p41-47 1979.

The radiance temperature (at 653 nm) of palladium at its melting point was measured using a subsecond-duration pulse-heating techique. Specimens in the form of strips with initially different surface roughnesses were used. The results do not indicate any dependence of radiance temperature (at the melting point) on initial surface or system operational conditions. The average radiance temperature (at 653 nm) at the melting point for 12 specimens is 1688 K on IPTS-68, with a standard deviation of 0.5 K and a maximum absolute deviation of 0.9 K. The total error in the radiance temperature is estimated to be not more than + or - 5 K.

PB80-131766 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Journal of Research of the National Bureau of Standards. Volume 84, Number 6, November-December 1979.
Bi-monthly rept.
1979, 89p
See also Volume 84, Number 4, PB-300 272.

Contents:
- Molecular dynamics study of liquid rubidium and the Lennard-Jones fluid;
- Room temperature poling of poly(vinylidene fluoride) with deposited metal electrodes;
- Generators for discrete polynomial L1 approximation problems;
- A graph coloring algorithm for large scheduling problems.

PB80-131774
(Order as PB80-131766, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Molecular Dynamics Study of Liquid Rubidium and the Lennard-Jones Fluid,
Raymond D. Mountain, and Steven W. Haan. 11 Jul 79, 8p
Included in Jnl. of Research of the National Bureau of Standards, v84 n6 p439-446, Nov-Dec 79.

Molecular dynamics calculations were made for three thermodynamic states of a model of liquid rubidium and for two states of the Lennard-Jones fluid in order to investigate the influence of density, temperature and interatomic potential on the spectra of density fluctuations in these fluids. Here the results for the intermediate scattering function, the radial distribution function, the velocity autocorrelation function and the transverse momentum autocorrelation function are presented in tabular form. The procedures employed in this study are discussed and the major features of these functions are described.

PB80-131782
(Order as PB80-131766, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Room Temperature Poling of Poly(Vinylidene Fluoride) with Deposited Metal Electrodes,
James M. Kenney, and Steven C. Roth. 21 May 79, 7p
Included in Jnl. of Research of the National Bureau of Standards, v84 n6 p447-453, Nov-Dec 79.

High values of pyroelectric and piezoelectric activity in fully-electroded films of poly(vinylidene fluoride) were obtained by 'conventional' (noncorona) poling at room temperature with sufficiently high fields. The avoidance of breakdown while obtaining high activity requires an understanding of the time dependence of both breakdown and activity. Time-to-breakdown as a function of field, and room-temperature pyroelectric activity (7-14 days after poling at 23.5C) as a function of poling time and field were obtained for 25-micrometers biaxially stretched films with evaporated aluminum electrodes. The highest activities were obtained by poling at the highest fields and poling to breakdown. These values are comparable with the highest that have been reported for this material using any poling temperature or using corona poling.

PB80-133580 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Atmospheric and Oceanic Science.
Pollution Assessment and Potential Mobility of Heavy Metals in Great Lakes Sediments.
Rept. for 1 Oct 78-30 Sep 79,
Richard M. Owen. Oct 79, 29p W80-02704, OWRT-A-101-MICH(1)
Contract DI-14-34-0001-9024

A sequential extraction scheme is used to determine the geochemical fractionation of Fe, Mn, Cr, Cu, and Zn in different grain size classes for sediment samples collected from within and around Little Traverse Bay, Lake Michigan. The partitioning of Fe, Cr, and Cu in both sediment and presently-eroding coastal bluff samples are similar. Also, the concentrations of these metals in fine grained particles are not proportional to the increased surface area of these grains compared with larger grain sizes. Both of these results indicate that these metals have undergone little authigenic change since entering the lacustrine environment. However, sediment Zn concentrations are significantly higher than in coastal bluff samples, and also have a different geochemical fractionation. This result is attributed to the precipitation of Zn in authigenic phases. In general, Mn shows relatively little mobility in the bay's oxidizing environment, except in areas where Mn nodules are forming.

PB80-141666 Not available NTIS
National Bureau of Standards, Washington, DC.
Unreliable Data - Its Impact in Modelling MHD Power-Generating Devices.
Final rept.,
J. R. Rumble, Jr., E. C. Beaty, and L. C. Pitchford. 1979, 4p
Prepared in cooperation with Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH.
Pub. in Proceedings International Conf. on CODATA (6th), Held at Santa Aavia, Italy on May 1978, p243-246 (Pergamon Press, New York, 1979).

A promising method of advanced utilization of coal as an energy source is power generation by coal-fired magnetohydrodynamics (MHD). This involves burning pulverized coal, adding an easily ionized metal salt, expanding the ionized gas through a nozzle and passing it through a high magnetic field. Electric current is extracted as the free electrons to migrate to the walls. Resistance in the circuit results from electron collisions with the gas atoms and molecules. The conductivity is the relevant physical characterization of the gas, and the electron scattering cross section is the measure of resistance. The authors have calculated the conductivity of typical MHD gases, using their best estimates of the cross-sections for all species present. The authors then recalculated the conductivity using the high and low estimates reflecting the experimental uncertainties for the cross-sections. The results show that the conductivity and hence, the electric current extractable, varied by as much as a factor of two. The implications of this variance are obvious in (1) the design of large scale MHD plants and (2) the basic physics research that must provide better cross-section data. It is clear that ignoring this possible large error can have potentially major effects in the success of MHD power generation.

PB80-143506 PC **A02**
Florida State Univ., Tallahassee. Dept. of Biological Science.
Muramic Acid Assay in Sediments,
Steven D. Fazio, William R. Mayberry, and David C. White. Aug 79, 3p NOAA-79122611
Grant NOAA-04-7-158-4406
Pub. in Applied and Environmental Microbiology, v38 n2 p349-350 Aug 79.

An improved chromatographic assay for muramic acid which is sufficiently sensitive for marine sandy sediments is described. It involves acid hydrolysis, thin-layer chromatography, and gas-liquid chromatography.

PB80-805468 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Detection and Sampling in Flue Gases. Volume 2. 1978-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 80,
Diane M. Cavagnaro. Feb 80, 129p
Supersedes NTIS/PS-79/0065, NTIS/PS-78/0176, and NTIS/PS-77/0172. For the companion Published Search of the American Petroleum Institute Data Base, see PB80-805476. See also Volume 1, 1964-1977, NTIS/PS-79/0064.

Reports are cited which discuss the detection and sampling of combustion product flue gases within the stack and at the stack exit. Detector design is covered, along with detection techniques for most types of possible pollutants, including NOx, SO2, CO, and particulates. (This updated bibliography contains 122 abstracts, 38 of which are new entries to the previous edition.)

PB80-805476 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Detection and Sampling in Flue Gases (Citations from the American Petroleum Institute Data Base).
Rept. for 1974-Dec 79,
Diane M. Cavagnaro. Feb 80, 162p
Supersedes NTIS/PS-79/0066. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-79/0064 and PB80-805468.

This bibliography discusses the detection and sampling of combustion flue gases within the stack and at the stack exit. The aspects covered include detector design and detection techniques for pollutants, such as NOX, SO2, CO, and particles. (This updated bibliography contains 155 abstracts, 18 of which are new entries to the previous edition.)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A079 883/5 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity Nstl Station MS
Shark Hazards on Navy and Marine Corps Operations. A Discussion of the Impact of Shark Hazards on Navy and Marine Corps Operations, Equipment and Personnel.
Technical note,
Bernard J. Zahuranec. Jun 76, 16p Rept no. NORDA-TN-2
Report of Workshop Held 18 May 76 at the Explosive Ordnance Disposal School, Indian Head, MD.

On 18 May 1976 a one day workshop was convened at the Explosive Ordnance Disposal School, Indian Head, Maryland, to discuss the shark hazard and its impact, both direct and indirect, on Navy and Marine Corps personnel, equipment, and operations.

AD-A079 922/1 PC **A05**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Environmental Effects on the Adhesion of Entermorpha clathrata.
Master's thesis,

John Campbell, III. 18 Apr 79, 80p Rept no. ARL/PSU/TM-79-99
Contract N00024-79-C-6043

The green alga Enteromorpha has been implicated as the predominant organism in the fouling of present-day oil tankers. This alga adheres to the hulls of ships by means of an adhesive matrix composed of carbohydrate and protein. The adhesiveness of this matrix has been found to be influenced by such environmental factors as light, darkness, temperature, and calcium. Light and darkness are correlated with degradative enzymes, while calcium is implicated in causing a hardening of the adhesive matrix. The light effect appears to initiate a phytochrome response which regulates those degradative enzymes responsible for decreasing adhesion. Temperature is indirectly related to adhesion by affecting growth. (Author)

AD-A079 954/4 PC **A03**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
Underwater Sound Scattering by Marine Organisms. A Review,
Ian C. Dunstan. Aug 79, 35p Rept no. MRL-R-756

Scattering of acoustic energy by inhomogeneities within the water column, or volume reverberation, is a major source of interference to underwater sonar systems. As naval defence systems have a high dependence on acoustic detection, knowledge of the factors that affect sonar interference is relevant to defence interests. This report reviews the literature on interference to sonar propagation by marine organisms, with particular emphasis on Australian waters. Acoustic scattering in the ocean generally occurs in discrete layers called Deep Scattering Layers. Theoretical and experimental investigations have shown conclusively that the scattering is caused by marine organisms. Reverberation profiles are dominated by the resonance back-scattering from gas-filled swimbladders of midwater fish, particularly at frequencies between 0.5 and 20 kHz. At higher frequencies, scattering from fish tissue and planktonic organisms becomes significant. Information on the identity and acoustic properties of sound scattering organisms within the Australian region is sparse. (Author)

PB80-139991 PC **A02**/MF **A01**
Maryland Univ., Cambridge. Center for Environmental and Estuarine Studies.
Qualitative Results of a Blue Crab Tagging Study in the Patuxent River.
Final rept.,
Robert E. Miller, Tibor T. Polgar, and Paul A. Souza. Dec 79, 21p PPSP-CP-79-4
Prepared in cooperation with Martin Marietta Corp., Baltimore, MD. Environmental Center.

A blue crab (Callinectes sapidus) tagging study was conducted in the Patuxent River during the summer of 1978. The 8,000 crabs collected were tagged, and released in groups at sites between the Benedict Bridge and Trueman Point, including locations near and within the Chalk Point power plant's discharge canal. The objectives of the study were to investigate power-plant-related crab mortalities, to characterize the population structure and changes in it, and to characterize movements of crabs. Results indicate that total impingement on cooling system screens affects a very small portion of the Patuxent blue crab population.

PB80-140825 PC **A05**/MF **A01**
Maryland Univ., Solomons. Chesapeake Biological Lab.
Effects of Time-Temperature Treatments on Fish Eggs and Larvae.
Final rept.,
Ted S. Koo. Feb 79, 100p UMCEES-79-47-CBL, PPSP/PPRP-34

Time-temperature experiments were designed to simulate power plant condenser passage by passive stages of five estuarine spawning fishes. Eggs and larvae of blueback herring, American shad, alewife, white perch and striped bass were exposed to delta Ts of 10-14.5C for 10-60 minutes. Base temperatures ranged from 17C to 27.7C. The results indicate that striped bass, American shad and blueback herring eggs are more tolerant than alewife and white perch eggs.

PB80-141302 PC **A12**/MF **A01**
Woods Hole Oceanographic Institution, MA.
The Vertical Flux of Particulate Organic Matter in the Peru Coastal Upwelling as Measured with a Free-Drifting Sediment Trap,
Nick Staresinic. Jan 80, 261p WHOI-80-4

An intercomparison of moored and free-drifting sediment traps of identical design was conducted off the coast of Peru in 1978. In each of three deployments to 30 m in a 120 m water column, the free-drifting sediment traps collected a greater amount of material. The quality of material in each type of trap also differed, material collected in the moored traps being of a consistently higher C/N ratio. Free-drifting sediment traps were used during 1977 and 1978 in an investigation of the vertical flux of particulate organic matter in the Peru coastal upwelling. Work was concentrated near the upwelling center located near 15 degrees S. The vertical flux of particulate organic carbon averaged about 9% of the daily primary production of carbon in Austral summer, 1977. In fall 1978 traps deployed at the base of the euphotic zone and at 50 m collected 20% and 10% of the daily primary production. Nocturnal fluxes were 50% greater than daytime fluxes. Qualitatively, night samples were distinguished from day samples by the presence of Euphausia mucronata molts. It is concluded that the vertical flux of particulate matter is an important component of the organic matter cycle of the Peru coastal upwelling ecosystem.

PB80-142136 PC **E05**/MF **A01**
Washington Univ., Friday Harbor. Friday Harbor Labs.
The Strait of Juan de Fuca Intertidal and Subtidal Benthos.
Annual rept. no. 2,
Carl F. Nyblade. Mar 79, 144p EPA-600/7-79-213
Prepared in cooperation with National Oceanic and Atmospheric Administration, Seattle, WA. Environmental Research Labs. Prepared for Marine Ecosystems (MESA) Puget Sound Project, Seattle, WA.

This report presents the second year results of an intertidal and shallow subtidal benthic sampling program at ten sites along the Washington State coast of the Strait of Juan de Fuca. The purpose of this program was to provide a quantitative characterization of the marine, shallow-water, bottom communities of the Strait. In the past five years the greater Puget Sound region has seen a dramatic increase in marine crude and refined oil transport. The possibility of Alaskan crude oil transshipment through this region to the Midwest means additional increases are possible in the near future. This tanker traffic increase also increases the risk of catastrophic and chronic oil pollution of the marine environment in this region.

PB80-143514 PC **A02**
California Univ., Bodega Bay. Bodega Marine Lab.
'Carcinonemertes errans' and the Fouling and Mortality of Eggs of the Dungeness Crab, 'Cancer magister',
D. E. Wickham. 29 Nov 79, 7p NOAA-79122803
Grant NOAA-04-6-148-44021
Pub. in Jnl. of the Fisheries Research Board of Canada, v36 n11 p1319-1324 1979.

Laboratory experiments analyzing the correlation between epibiotic fouling and mortality of the eggs of the Dungeness crab, Cancer magister, reveal that both can result from predation on crab eggs by the nemertean Carcinonemertes errans. Fouling appears to be stimulated by the release of yolk material into the egg clutch through worm feeding and defecation. Significant correlations exist between worm density and both fouling and mortality in field samples.

PB80-143548 PC **A02**
Scripps Institution of Oceanography, La Jolla, CA.
Some Aromatic Compounds from the Marine Sponge 'Plakortis halichondrioides',
B. N. Ravi, Robert W. Armstrong, and D. John Faulkner. c1979, 6p NOAA-79122808
Grant NOAA-04-6-158-44110
Pub. in Jnl. of Organic Chemistry, v44 p3109-3113 1979.

A sample of the marine sponge Plakortis halichondrioides was shown to contain two major compounds and five minor metabolites. The structures of the metabolites were elucidated by detailed analysis of spectral data. The probable biosynthetic correlation between the major metabolities and the relationship between these metabolites and the cyclic peroxides previously isolated from P. halichondrioides are discussed. (Copyright (c) 1979 by the American Chemical Society.)

PB80-143704 PC **A10**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume I.
Final rept.
May 79, 203p SAI-78-934-LJ-V1, BLM/YN/SR-79/01
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. Detailed community descriptions were produced at 22 rocky intertidal, 19 mussel bed and 19 sandy beach sites. Hydrocarbon tissue burdens of sea mussels (Mytilus) were found to reflect ambient environmental conditions; tissue burdens variably matched either the particulate or the dissolved seawater phases or both, depending on the location.

PB80-143712 PC **A17**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume II, Report 1, Sections 1-7.
Final rept.
May 89, 400p SAI-78-934-LJ-V2/1-7, BLM/YN/SR-79/02
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. Detailed community descriptions were produced at 22 rocky intertidal, 19 mussel bed and 19 sandy beach sites. Hydrocarbon tissue burdens of sea mussels (Mytilus) were found to reflect ambient environmental conditions. Sediment hydrocarbon levels showed winter highs. Trace metals in sediments tended to reflect local mineralogical provenance rather than human input.

PB80-143738 PC **A18**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume II, Report 1, Sections 16-22.
Final rept.
May 79, 418p SAI-78-934-LJ-V2/16-22, BLM/YN/SR-79/04
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. This report provides an assessment of the distribution, abundance, and community structure of the biological communities, within the area.

PB80-143746 PC **A99**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume II, Reports 2-9.
Final rept.
May 79, 742p SAI-78-934-LJ-V2/2-9, BLM/YN/SR-79/05
Contract DI-AA550-CT-7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. This report is a survey of macroorganisms of the intertidal zones after they have been affected by mechanical disturbances, climate changes, and predation.

PB80-143753 PC **A25**/MF **A01**
Science Applications, Inc., La Jolla, CA.

Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume II, Reports 10-19.
Final rept.
May 79, 596p SAI-78-934-LJ-V2/10-19, BLM/YN/SR-79/06
Contract DI-AA550-CT7-44
Color illustrations reproduced in black and white.

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. Detailed community descriptions were produced at 22 rocky intertidal, 19 mussel bed and 19 sandy beach sites. Hydrocarbon tissue burdens of sea mussels (Mytilus) were found to reflect ambient environmental conditions; tissue burdens variably matched either the particulate or the dissolved seawater phases or both, depending on the location. Trace metals in sediments tended to reflect local mineralogical provenance rather than human input. Trace metals concentrations in organisms were highly variable and are not recommended as oil pollution indicators.

PB80-143761 PC **A10**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume III, Reports 1-11.
Final rept.
May 79, 202p SAI-78-934-LJ-V3/1-11, BLM/YN/SR-79/07
Contract DI-AA550-CT7-44
See also Volume 1, PB-290 740 and Volume 3, PB-300 346.

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. This report presents the materials and methods of analysis and sampling for the plant and animal species of the intertidal zone.

PB80-143779 PC **A99**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume IV. Report 1, Appendices A-E.
Final rept.
May 79, 921p SAI-78-934-LJ-V4/A-E, BLM/YN/SR-79/08
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Detailed community descriptions were produced at 22 rocky intertidal, 19 mussel bed and 19 sandy beach sites. The report is a survey of the macrobiota of the intertidal area as a function of tidal height.

PB80-143787 PC **A99**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume IV, Report 1, Appendix F.
Final rept.
May 79, 1086p SAI-78-934-LJ-V4/APP-F, BLM/YN/SR-79/09
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. Detailed community descriptions were produced at 22 rocky intertidal, 19 mussel bed and 19 sandy beach sites. The report includes statistical data and 9 appendices.

PB80-143795 PC **A99**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Intertidal Study of the Southern California Bight, 1977/1978 (Third Year). Volume IV, Reports 2-12.
Final rept.
May 79, 919p SAI-78-934-LJ-V4/2-12, BLM/YM/SR-79/10
Contract DI-AA550-CT7-44

This report completes a three-year baseline study of the intertidal zone in the Southern California Bight. Biological community structure, geochemistry and biocontamination aspects were studied at a number of sites representing the rocky shore, sandy beach and slough habitats of island and mainland coasts throughout the Bight. This is a summary report which contains six appendices on biological community data, and chemical analysis of metals in biological samples and sediments.

8B. Cartography

AD-A079 553/4 PC **A07**/MF **A01**
Sri International Menlo Park CA
Interactive Aids for Cartography and Photo Interpretation.
Final technical rept. 12 May 76-9 Oct 79,
Martin A. Fischler, G. J. Agin, H. G. Barrow, R. C. Bolles, and L. Quam. Dec 79, 130p
Contract DAAG29-76-C-0057, ARPA Order-2894-5

Research at SRI International under the ARPA Image Understanding Program was initiated to investigate ways in which diverse sources of knowledge might be brought to bear on the problem of analyzing and interpreting aerial images. The initial phase of research was exploratory and identified various means for exploiting knowledge in processing aerial photographs for such military applications as cartography, intelligence, weapon guidance, and targeting. A key concept is the use of a generalized digital map to guide the process of image analysis. The results of this earlier work were integrated in an interactive computer system called 'Hawkeye'. This system provides not only basic facilities necessary for a wide range of tasks in cartography and photo interpretation, but also a framework within which other applications can be readily demonstrated.

AD-A079 660/7 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center Washington DC
Development of A Raster Scanner and Color Separation System (SCI-TEX Response 250 Cartographic System).
Conference paper,
Donald Wirak. Jan 80, 9p

The SCI-TEX Response 200 System is used for color separating patterns and floral designs in the textile industry. Tests showed that the system could scan several colors and that the digitized data could be edited, altered, and enhanced. In addition, the machine, with restrictions can scan colored areas as large as a square yard. With this knowledge, a newer model, the SCI-TEX Response 250 Cartographic System, was developed with larger storage and better scanning capabilities. Three examples of in-house production are discussed and analyzed. This paper was written from the cartographic color separation viewpoint. Another paper, 'Chart Modification and Reproduction with a Raster System,' presented at this convention by Mr. Jan Schneier, was written from an equipment operations viewpoint. (Author)

AD-A080 098/7 PC **A03**/MF **A01**
Rand Corp Santa Monica CA
Distance Estimation from Cognitive Maps.
Interim rept. Nov 77-Feb 79,
Perry W. Thorndyke. Nov 79, 49p Rept no. RAND/R-2474-ONR
Contract N00014-78-C-0042

Four experiments investigated map clutter as a source of distortion in distance estimates. In Experiments 1 and 2, subjects estimated distances between pairs of points on a memorized map. In Experiment 1, subjects learned relative distances among cities incidentally; in Experiment 2, they learned them intentionally. In both experiments, estimates increased as a linear function of the number of intervening points along the path. In Experiment 3, subjects estimated distances while viewing the map. The clutter effect was reduced but not eliminated. In Experiment 4, the clutter effect was demonstrated using subjects' pre-experimental knowledge of U.S. geography.

AD-B013 158/1 PC **A07**/MF **A01**
Bendix Research Labs Southfield Mich
ACE Design Study and Experiments.
Final technical rept. 20 May 74-23 Oct 75,
Arliss E. Whiteside, Gerald A. Brumm, Henry L. Ohlef, Leonard A. Forrest, and Alan J. Hutchenreuther. Jun 76, 137p BRL-7963, RADC-TR-76-166
Contract F30602-74-C-0260
Distribution limitation now removed.

Studies and experiments were performed to establish a design for a production photogrammetric system referred to as Advanced Compilation Equipment (ACE). The function of this equipment is to rapidly measure terrain heights from aerial photography and to record this data in digital form. The work included study and evaluation of user requirements, preparation and analysis of a tentative ACE design, performance of experiments on the AS-11B-X automated stereomapper in support of the ACE studies, and preparation of ACE system and viewer design specifications. Design specification were prepared for two versions of the ACE system, one optimized for near-term needs and the other optimized for longer-term needs. (Author)

E80-10044 PC **A03**/MF **A01**
Lockheed Electronics Co., Inc., Houston, TX.
Large Area Crop Inventory Experiment (LACIE). The Boundary Pixel Study in Kansas and North Dakota.
Technical memo.,
D. T. Register, and A. L. Ona. Sep 79, 35p LEC-12826, NASA-CR-160365, JCS-14563
Contract NAS9-15800
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD., and Department of Agriculture, Washington, DC.

The author has identified the following significant results. The statistical mapping approach to handling boundary pixels can be used as a standard for objectively comparing the cluster based technique, the maximum likelihood estimate based technique, and multicategory labeling.

PAT-APPL-6-045 368 PC **A02**/MF **A01**
Department of the Navy Washington DC
Reference Map Generation Method.
Patent Application,
Richard L. Warren, and William D. Lochrie. Filed 31 May 79, 9p AD-D006 808/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides a reference map generation method which is a multi-level procedure structured to minimize cost and provide the required reliability in the selected maps. Given a geographic area within which a terrain correlation fix is desired and a desired flight heading, the first phase is to evaluate the area by inspection of small scale topographic maps. The terrain altitude profiles within a candidate geographic area are digitized and iterative Auto-MADs are calculated in potential reference map areas to determine if there are significant terrain ambiguities, the Auto-MAD array being calculated by computing the mean absolute difference (MAD) between each profile in the candidate reference map and each synthetic radar terrain profile. The synthetic radar terrain profile is obtained directly from the digitized terrain data with no noise introduced. The final phase involves the evaluation of reference map performance using a Monte Carlo simulation procedure, noise models used as inputs being based on analytical models of the process and on analysis of flight test data. The process is iterated until a reference map which is free of terrain ambiguity problems is identified which meets probability of correlation (p sub c) and circle of equal probability (CEP) requirements. Therefore, it is an object of the present invention to provide a reference map generation method which ensures fix reliability by identifying reference maps with no significant terrain profile ambiguities.

Group 8B—Cartography

PAT-APPL-6-078 358 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Automated Satellite Mapping System (MAPSAT).
Patent Application,
Alden P. Colvocoresses. Filed 24 Sep 79, 23p
PB80-139413
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application describes a system for automatically mapping the surface of a celestial body, such as the earth. A relatively stable satellite is placed into a near polar, sun-synchronous orbit about the body. The satellite includes two or three solid-state linear sensing photo-detector array sets mounted transversely to the satellite heading. Data are acquired by sensing elemental areas of strips from a first position in space with a first array set, and then when the satellite has moved to a second position, imaging the same elemental areas of each strip with a second array set. Sensing of strip by the first array set produces a first one-dimensional flow of data. Sensing of the strip by the second array set produces a second one-dimensional flow of data which, when correlated with the data from the first array set, results in data representative of elevational information for each incremental area of each strip. The system allows near real-time mapping of a surface.

PATENT-4 170 415 Not available NTIS
Department of the Interior, Washington, DC.
System for Producing Orthophotographs.
Patent,
George P. Lemeshewsky, Thomas O. Dando, Arthur R. Shope, Jr., and Kenneth D. Kuck. Filed 15 Jul 77, patented 9 Oct 79, 22p PB80-139132, PAT-APPL-816 058
Supersedes PB-276 095.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates toward instrumentation for producing orthophotographs by generating digital profile information from a stereoscopic model, storing the digital information on magnetic tape, and using the information in an offline mode to control the drive systems of an orthophotograph printer.

8C. Dynamic Oceanography

AD-A079 669/8 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Observations of Strongly Nonlinear Internal Motion in the Open Sea Using a Range-Gated Doppler Sonar.
Summary rept.,
Robert Pinkel. 24 Oct 77, 20p Rept no. MPL-U-86/77
Contracts N00014-69-A-0200-6041, N00014-75-C-0749
Pub. in Jnl. of Physical Oceanography, v9 n4 p675-686 Jul 79. Sponsored in part by Grant NSF-OCE76-02361.

No abstract available.

AD-A079 822/3 Not available NTIS
British Columbia Univ Vancouver Inst of Oceanography
Trench Waves,
Lawrence A. Mysak, Paul H. LeBlond, and William J. Emery. 4 Sep 78, 13p
Availability: Pub. in Jnl. of Physical Oceanography, v9 n5 p1001-1013 Sep 79 (No copies furnished by DTIC).

No abstract available.

N80-16700/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Enhanced Nodal Equilibrium Ocean Tide and Polar Motion.
B. V. Sanchez. Nov 79, 23p NASA-TM-80592
Subm-Submitted for Publication.

The tidal response of the ocean to long period forcing functions was investigated. The results indicate the possibility of excitation of a wobble component with the amplitude and frequency indicated by the data. An enhancement function for the equilibrium tide was postulated in the form of an expansion in zonal harmonics and the coefficients of such an expansion were estimated so as to obtain polar motion components of the required magnitude.

PATENT-4 172 255 Not available NTIS
Department of the Interior, Washington, DC.
HF Coastal Current Mapping Radar System.
Patent,
Donald E. Barrick, and Michael W. Evans. Filed 8 Aug 77, patented 23 Oct 79, 9p PB80-139140, PAT-APPL-822 868
Supersedes PB-275 547.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system is described for radar remote sensing of near surface ocean currents in coastal regions. The system employs a pair of low power, transportable high frequency radar units to scatter signals from the shore off to the ocean waves. Underlying surface currents impart a slight change in velocity to the ocean waves which is detected by the radar units. Each radar unit can determine the angular direction of arrival of the radar echo signals by comparing the phase of the signals received at three short antennas on the shore. Signals scattered from the same point on the ocean by each of the two geographically separated radar units are used to construct a complete current vector for that point. The radar pair takes simultaneous measurements over an ocean area with a predetermined grid pattern. Vectors are constructed for each square section of the grid, and a map of the near surface current field is output in real-time by an on-site mini-computer.

PB80-135064 Not available NTIS
Brown Univ., Providence, RI. Dept. of Geological Sciences.
The Subtropical Convergence and Late Quaternary Circulation in the Southern Indian Ocean,
Warren L. Press, William H. Hutson, and Douglas F. Williams. c1979, 11p NSF/IDOE-79-138
Grants NSF-OCE77-22888, NSF-ATM77-07755
Prepared in cooperation with Oregons State Univ., Corvallis. School of Oceanography, and South Carolina Univ., Columbia. Dept. of Geology.
Pub. in Marine Micropaleontology, n4, p225-234 1979.

The dominance of subpolar and subtropical planktonic foraminifera can be used to reliably identify the meridional position of the Subtropical Convergence (STC) in deep-sea sediments of the southern Indian Ocean. Application of these new faunal criteria show that the STC has moved less than 5 degrees of latitude northward from its present location (38 degrees-40 degrees S) during glacial maxima of the last 500,000 years. The STC shifted slightly south of its present position during interglacial isotopic stages 7, 9, 11, and 13 but not during the last interglacial (stage 5). Accurate mapping of the STC position in past oceans enables a better understanding of circulation patterns and of the response of the subtropical gyre and subantarctic water mass to glacial-interglacial cycles during the late Quaternary.

PB80-135585 PC **A02**/MF **A01**
Ocean Data Systems, Inc., Monterey, CA.
Ocean Thermal Energy Conversion: Resource, Ecological and Environmental Studies.
Interim rept.,
William E. Hubert, and Nathan L. Greenfeldt. Nov 75, 25p NSF-RA-N-75-473
Contract NSF-C1020
See also PB-266 704.

As one of several contributions in a study of ocean thermal energy conversion (OTEC), this report concentrates on ocean currents and severe ocean storms as they affect OTEC plant site selection. An examination of hydrographic center pilot charts indicates that surface currents in the Atlantic portion of the area studied are stronger than those in the Pacific. Pacific currents show considerable seasonal variations when compared to those in the Atlantic. The effects of anomalous currents having an impact on OTEC plant operations are analyzed. Also included in the report are storm and hurricane statistics for 1949 through 1972 and for 1974 in the form of weather maps of the U.S. Department of Commerce and the U.S. Navy Environmental Prediction Research Facility. These maps show directions of mean surface currents and speeds, and summarize storm and hurricane statistics by seasons. The frequency of occurrence of tropical cyclones (1931-1974) and similar Eastern North Pacific Statistics (1966-1973) are included.

PB80-139843 PC **A15**/MF **A01**
Miami Univ., Coral Gables, FL.
Coastal Upwelling Ecosystems Analysis. Technical Report 59. Physical Dynamics of the Coastal Upwelling Frontal Zone off Oregon.
Doctoral thesis,
Thomas Brian Curtin. Sep 79, 336p NSF-IDOE-CUEA-TR-59, NSF-IDOE-79-127

The transient (wind-driven), coastal upwelling frontal zone off Oregon is described in terms of the main kinematic and hydrographic scales, geostrophy, potential vorticity, cross-shelf circulation and mixing. Along-shelf flow is in geostrophic balance in the interior one third of the water column over the shelf, with a tendency for the geostrophic shear to exceed the observed shear inshore of the frontal zone above 40 m. During spin-down, the surface density front moves shoreward and intensifies; the interior density front remains stationary at mid-shelf and weakens. Transport is shore-ward in the upper 2/3 of the water column, and seaward in the layer near the bottom. The structures of the water mass front, chlorophyll distributions, and horizontal velocity fields suggest a re-circulation cell occurs in-shore of the interior density front. The frontal zone is most two-dimensional during intervals of sustained upwelling or downwelling favorable winds exceeding a minimum magnitude. During times of slack winds or wind reversals, the frontal zone is inherently three-dimensional.

PB80-140452 PC **A09**/MF **A01**
National Science Foundation, Washington, DC. Div. of Polar Programs.
Problems of the Arctic and the Antarctic. Collection of Articles. Number 45, 1974,
A. F. Treshnikov. c1979, 179p TT-75-52083
Trans. of Problemy Arktiki i Antarktiki (USSR). Sbornik Statei, n45 1974, by Y. V. Kathavate. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

This volume includes 16 original papers devoted to the study and investigation of different aspects of arctic and antarctic climatology. A wide range of subjects have been covered in this volume. The first four papers deal with glacial water reserve and discharge in the Arctic, Arctic cooling, large-scale sea level oscillations in the northern hemisphere and high relative humidity in the Arctic. Five papers are devoted to atmospheric studies in the polar regions. They cover such topics as cyclic oscillations, conjuction of certain centers of atmospheric action, characteristics of total radiation, change in wind speed and direction during geomagnetic disturbances and the relation of ionospheric troughs and plasmapause in the afternoon section. There are three papers on studies relating to the phase composition of ice.

PB80-140460 PC **A08**/MF **A01**
National Science Foundation, Washington, DC. Div. of Polar Programs.
Problems of the Arctic and the Antarctic. Collection of Articles, Number 46, 1975,
A. F. Treshnikov. c1979, 174p TT-76-52053
Trans. of Problemy Arktiki i Antarktiki (USSR). Sbornik Statei, n46 1975, by Y. V. Kathavate. See also Number 47, PB-282 219-T. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

This volume contains 17 original papers devoted to hydrometeorological investigation in northern and southern hemispheres. The subject matter of this volume can be broadly divided into hydrometeorology, oceanography, ionospheric studies, ice conditions and topics of general nature. Hydrodynamic forecast for high latitudes, winter meridional

circulation of air, vertical structure of troposphere, change of atmospheric pressure in the Arctic are some of the topics which deserve special attention of readers. Ice conditions of seas occupy a significant place in this volume.

PB80-143597 PC **A02**
Florida Univ., Gainesville. Dept. of Civil Engineering.
Predicting Circulation Changes from Bathymetric Modification,
Donald Steven Graham, John Paul Daniels, and B. A. Christensen. Sep 79, 20p NOAA-79122612
Pub. in Proceedings of the Specialty Conference on 'Civil Engineering in the Oceans IV', ASCE, held in San Francisco, CA. on September 10-12, 1979, p531-549.

Simulations were made as part of a proposal to demonstrate the utility of hydrodynamic models to simulate circulation effects caused by topographic and bathymetric changes. The results demonstrate: (1) that the CAFE-1 hydrodynamic model is moderately predictive; (2) that the results can be presented graphically in a clear and understandable format; and (3) that spoil islands and causeways can affect tidal circulation to a much greater extent than had been surmised. It is likely not adequate to leave a few passes in a causeway oriented normally to the predominant flow direction. Spoil island sizes, locations and shapes have to be carefully designed to minimize significant changes in circulation and flushing, and to avoid interacting effects. Finally, in bays experiencing flushing problems, the pre-existing circulation can be estimated by removing islands, causeways, etc. from the model.

8E. Geodesy

AD-A079 782/9 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Geodetic Journal (Selected Articles),
Nedjeljko Francula, and Momcilo Dordevic. 2 Aug 79, 37p Rept no. FTD-ID(RS)T-0947-79
Edited trans. of Geodetski List (Yugoslavia) v32(55) n1-3 p5-17, 23-30 1978.

No abstract available.

AD-A079 783/7 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Geodesy and Cartography (Selected Articles),
Janusz Siedzinski, and Jan Krynski. 10 Aug 79, 46p Rept no. FTD-ID(RS)T-0948-79
Edited trans. of Geodezja i Kartografia (Poland) v27 n1 p3-27 1978.

No abstract available.

AD-A079 790/2 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
Surface Harmonic Expansions and Mean Gravity Anomalies.
Final rept.,
John V. Shebalin. Sep 79, 41p Rept no. NSWC/TR-79-154

The determination of surface harmonic expansion coefficients from mean gravity anomaly value is discussed. An orthogonal collocation method for optimally determining these coefficients is presented. In addition, well known approximate methods for coefficient determination are also considered. (Author)

AD-A079 966/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Inertial Geodesy,
H. Moritz. 25 Jul 79, 14p Rept no. FTD-ID(RS)T-0946-79
Edited trans. of Geodezja i Kartografia (Poland) v27 n3 p163-169 1979.

No abstract available.

AD-A079 967/6 PC **A04**/MF **A01**
Foreign Technology Div Wright-Patterson AFB Oh
Geodesy and Mapping (Selected Articles),
Barbara Kolaczek, Roman Galas, Marcin Barlik, Magdalena Dukwicz, and Aniela Makowska. 16 Aug 79, 58p Rept no. FTD-ID(RS)T-0953-79
Edited trans. of Geodezja i Kartografia, (Poland) v27 n2 p83-100, 121-133 1978.

No abstract available.

AD-B028 228/5 PC **A08**/MF **A01**
Analytic Sciences Corp Reading Mass
A Unified Approach to Mapping, Charting, and Geodesy (MC and G) Data Base Structure Design.
Final rept. 30 Oct 77-31 May 78,
William K. Sharpley, John F. Leiserson, and Allan H. Schmidt. 31 May 78, 173p TASC-TR-1101-1, ETL-0144
Contract DAAK70-77-C-0265
Distribution limitation now removed.

This is the final report for an investigation of a possible unified approach to mapping, charting, and geodesy (MC and G) data base structure design. The purposes of this investigation were to analyze the implications of various image archive structures in support of MC and G production and to demonstrate the potential value of recent results in Topological Data Base structures in MC and G applications. This report presents the results of the investigation. It includes analysis of the merits and deficiencies of the various approaches and the results of an experimental application of Topological Data Base Structuring principles in an example MC and G data base processing problem. (Author)

8F. Geography

E80-10031 PC **A17**/MF **A01**
Geological Survey, Reston, VA.
Central Atlantic Regional Ecological Test Site: A Prototype Regional Environmental Information System. Volume 1. Central Atlantic Regional Ecological Test Site (CARETS) Project.
Final report,
Robert H. Alexander. 1979, 385p NASA-CR-162442
NASA Order S-70243-AG
Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, SD. 57198.

The author has identified the following significant results. LANDSAT data showed the test region in 1972 to be 9% urban and built-up land, 38% agriculture, 50% forest, 3% nonforested wetlands, and less than 1% barren land, exclusive of water-covered areas. A comprehensive user evaluation revealed greatest demand for high-altitude aerial photography and the detailed maps and data products that can be derived from the Metropolitan area agencies found relatively little use for LANDSAT imagery at 1:250,000 scale and corresponding manually interpreted land use maps.

8G. Geology and Mineralogy

AD-A079 629/2 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
The Oblique Intersection of the Mid-Atlantic Ridge with Charlie-Gibbs Transform Fault.
Summary rept.,
Peter Lonsdale, and Alexander Shor. 2 Mar 78, 23p Rept no. MPL-U-54/77
Contract N00014-75-C-0749, Grant NSF-DES74-03690
Pub. in Tectonophysics, v54 p195-209 1979. Prepared in cooperation with Woods Hole Oceanographic Inst., MA. Rept. no. WHOI-CONTRIB-4115.

No abstract available.

AD-A079 833/0 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Magnetic Pattern of the Western Atlantic South of 40 N,
Anna M. Einwich, and Peter R. Vogt. Apr 78, 23p Rept no. NORDA-16

The magnetic pattern in the western North Atlantic near the east coast of North America is dominated by a linear region of low magnetic intensities. This magnetic 'quiet zone' possesses characteristics of seafloor spreading: linearity, continuity, and bilateral symmetry with the quiet zone found in the easternn Atlantic. Its small internal anomalies can be shown to have a spatial origin. Some appear linear, but discontinuous, and a degree of correlation can be found over large, intervening distances. A portion of the quiet zone shows possible subdivision into an inner and outer smooth zone. The inner smooth zone, near the shelf edge, has no counterpart in the eastern Atlantic, and, when considered as the development of a proto-Atlantic, could account for the comparatively greater width of the total western quiet zone. Pre-rift fits of the African and North American continents usually show the African continental margin superimposed on both the inner smooth zone and the unique anomalies of the Blake Plateau which lies to the south. An oceanic origin for the inner smooth zone implies the same origin for a major part of the Blake Plateau. The magnetic zones show little relationship with present current-shaped seafloor topography, but offsets in the lineations of prominent anomalies attest to displacements in the rock floor beneath the sediments.

AD-A080 064/9 PC **A07**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Terrain Analysis Procedural Guide for Geology (Report Number 3 in the ETL Series on Guides for Army Terrain Analysts).
Technical rept.,
James Tazelaar. Nov 79, 150p Rept no. ETL-0207
See also report no. 2, AD-A080 021. Includes envelope with maps and charts. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report provides the methods and procedures necessary for obtaining information on geology from the most accessible sources, which are topographic maps ans aerial photos. The report is written for the U.S. Army Terrain Analyst, and presents the detailed methodology necessary for obtaining approximately 18 Geology Data Elements useful in preparing factor overlays. (Author)

N80-16651/5 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Processing of Multispectral Thermal IR Data for Geologic Applications.
A. B. Kahle, D. P. Madura, and J. M. Soha. 15 Nov 79, 43p NASA-CR-162682, JPL-PUB-79-89
Contract NAS7-100
Misc-Original Contains Color Illustrations.

Multispectral thermal IR data were acquired with a 24-channel scanner flown in an aircraft over the E. Tintic Utah mining district. These digital image data required extensive computer processing in order to put the information into a format useful for a geologic photointerpreter. Simple enhancement procedures were not sufficient to reveal the total information content because the data were highly correlated in all channels. The data were shown to be dominated by temperature variations across the scene, while the much more subtle spectral variations between the different rock types were of interest. The image processing techniques employed to analyze these data are described.

PB80-131527 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Civil Engineering.
Far-Field Signals Radiating from a Fracture Event,
J. D. Achenbach, and A. K. Gautesen. 1975, 21p NSF-RA-N-75-482
Grant NSF-AER75-00187

Analytical results are presented related to the feasibility of mapping hydraulic fractures by measuring acoustic signals emitted in the course of the fracturing process. The process of hydraulic fracturing is considered as a sequence of fracture events. The signal emitted by one such event is analyzed here. The analytical results show that a single fracture event produces a longitudinal (L) pulse and a transverse (T) pulse, which can be distinguished by arrival times, and directions and orders of magnitude of the corresponding particle velocities. For the L-pulse the particle velocity is largely in the radial direction relative to the center of the fracture area A. The T-pulse contains an additional component normal to the plane of A. For a single observation point the analytical results indicate that information can be obtained for the position of A, the orientation of A, and to some extent for the size of A.

PB80-133754 PC **A02**/MF **A01**
California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Science.
Rapid Excavation Using Cavitating Liquid Jets Generated by Electric Sparks,
Albert T. Ellis, and John E. Starrett. 1976, 5p
NSF/RA-761816
Grant NSF-APR75-15814

To define and measure the high-speed drilling capacity of a system combining the techniques of the electric spark drill and the liquid jet erosion drill, analytical and experimental studies have been conducted. In this system, the electric spark drill utilizes the ultra high velocity jet resulting from collapse of the cavity in the drilling liquid generated by the spark. Piezoelectric pressure gages were used both as a solid for the bubble to collapse on and as hydrostatic pickups in the volume of liquid. Both devices consistently showed greater stresses from the bubble collapse jet than from the shockwave from the initial spark at voltages up to 15,000. Development of ultra short exposure time, high repetition rate photography with long enough observation times to cover bubble life histories was achieved. High speed photographs showing bubble radius vs. time and simultaneous pressure measurements in the liquid were made at ambient pressures from one to fifty atmospheres. Photographic observations with simultaneous measurements of total force on a flat plate were made in a water tunnel. Water tunnel bubble records show that the bubbles travel downstream into the stagnation region and collapse on the flat plate despite the adverse pressure gradient. The bubble assumes an ellipsoidal shape with the major axis parallel to the flat plate surface and normall to the flow direction.

PB80-134992 Not available NTIS
Lamont-Doherty Geological Observatory, Palisades, NY.
A Transfer Function for Estimating Paleoceanographic Conditions Based on Deep-Sea Surface Sediment Distribution of Radiolarian Assemblages in the South Atlantic,
Joseph J. Morley. c1979, 16p LDGO-2865, NSF/IDOE-79-132
Grants NSF-GX-28671, NSF-OCE75-19627
Pub. in Quaternary Research, n12 p381-395 1979.

A quantitative analysis of radiolarian species in 57 deep-sea surface sediment samples from the South Atlantic Ocean produced four geographically distinct assemblages (tropical, polar, gyre margin, and subtropical). The distributions of these assemblages or factors coincide with present-day patterns of sea-surface temperatures or water masses. These four assemblages were used to construct a transfer function relating radiolarian distribution in the surface sediments to present-day winter and summer temperatures using standard regression techniques. As a test of the quality of this transfer function, temperatures were estimated on surface sediment samples from the eastern South Pacific. The temperatures produced by the transfer function compared favorably with the observed (present-day) winter and summer sea-surface temperatures at these sites. (Copyright (c) 1979 by the University of Washington.)

PB80-135056 Not available NTIS
Lamont-Doherty Geological Observatory, Palisades, NY.
Comparison of Glacial and Interglacial Oceanographic Conditions in the South Atlantic from Variations in Calcium Carbonate and Radiolarian Distributions,
Joseph J. Morley, and James D. Hays. c1979, 15p LDGO-2866, NSF/IDOE-79-140
Grants NSF-GX-28671, NSF-OCE75-19627
Pub. in Quaternary Research, n12 p396-408 1979.

Temperature estimates produced by a radiolarian-based transfer function, factor distributions of radiolarian assemblages, and variations in calcium carbonate were used to reconstruct the oceanographic conditions in the South Atlantic during the last glacial maximum (18,000 yr B.P.). This study suggests that while the position of the Subtropical Convergence at 18,000 yr B.P. was very similar to its present position, the Antarctic Polar Front shifted northward 1 to 3 degrees of latitude in the eastern South Atlantic and 3 to 5 degrees of latitude in the western South Atlantic. The largest temperature changes occurred in the subantarctic region and along the eastern portion of the Subtropical Gyre. (Copyright (c) 1979 by the University of Washington.)

8H. Hydrology and Limnology

AD-A079 648/2 PC **A05**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Phosphorus Transport in Rivers.
Final rept.,
Frank H. Verhoff, David A. Melfi, David B. Baker, and Stephen M. Yaksich. Nov 78, 100p
Report on Lake Erie Wastewater Management Study.

The research work contained in this report concerns the transport of total phosphorus and orthophosphorus to Lake Erie. The various calculational techniques for analyzing data obtained from Lake Erie tributaries are presented. These calculations were developed to determine the source of the phosphorus and to quantify the input to the lake. The source and quantity of phosphorus devised for Lake Erie. The first section of this report presents the basic concepts, mass balances (that applied to the water and that applied to the phosphorus), and force relationships. The second section of this report concerns the quantification of total phosphorus input to Lake Erie river basins and shortline sources. A computational method called the Flow Interval Method was devised to permit the calculaion of total phosphorus influx without measuring the total phosphorus concentration for the entire year. Another important aspect of reducing total phosphorus influx from river basins is the understanding of the transport processes in rivers. The third section of this report concerns the transport of total phosphorus during storm events. The fourth section of this report presents the derivation of the necessary equations used to calculate the distance of the travel density function form measurements of the water flow rate and the total phosphorus concentrations at a point in the stream.

AD-A079 650/8 PC **A08**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Lake Erie Wastewater Management Study, Methodology Report.
Final rept.,
John R. Adams, and Steven R. Predmore. Mar 79, 167p

This Methodology Report deals with the second phase of the Corps of Engineers study effort to develop a recommended wastewater management program to restore and rehabilitate Lake Erie. The Preliminary Feasibility Report of Phase I state that control of diffuse sources of phosphorus would be required to restore Lake Erie. This conclusion has not changed and this report presents alternative management scenarios for control of diffuse sources. (Author)

AD-A079 651/6 PC **A10**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Water Quality Data for Lake Erie Basin Small Watershed Sampling Stations.
Final rept.
Mar 79, 209p
Report on Lake Erie Wastewater Management Study.

This report presents data that represents water quality information collected at 44 Lake Erie basin small-watershed sampling stations for the Lake Erie Wastewater Management Study. A list of these stations along with the U. S. Geological Survey identification number (if available) and drainage area is provided and the approximate location of the sampling stations in relation to the Lake Erie drainage basin are indicated. Samples collected were analyzed for the following parameters: total phosphorus, ammonia nitrogen, nitrite-nitrate nitrogen, chlorides, dissolved silica, suspended solids, and conductivity. Twenty percent of the samples were analyzed for total kjeldahl nitrogen and iron. Less than 1 percent of the samples were analyzed for total solids, total dissolved solids, total organic carbon, dissolved organic carbon, total carbon, soluble phosphorus, and chemical oxygen demand. (Author)

AD-A079 652/4 PC **A14**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Water Quality Data for Lake Erie Basin Tributary Mouth Sampling Stations.
Final rept.
Dec 78, 302p
Report on Lake Erie Wastewater Management Study.

The data presented in this report represents water quality information collected at 22 Lake Erie Basin tributary mouth sampling stations for the Lake Erie Wastewater Management Study. A list of these stations along with the U. S. Geological Survey station identification number and drainage area is provided and the approximated location of the sampling stations in relation to the Lake Erie drainage basin are indicated. Samples collected were analyzed for the following parameters: total phosphorus, amonia nitrogen, nitrite-nitrate nitrogen, chlorides, dissolved silica, suspended solids, and conductivity. Twenty percent of the samples were analyzed for total kjeldahl nitrogen and iron. Two percent of the samples were analyzed for total solids, total dissolved solids, total organic carbon, dissolved organic carbon, total carbon, and chemical oxygen demand. In addition, less than 1 percent of the samples were analyzed for soluble phosphorus. (Author)

AD-A079 691/2 PC **A12**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Water Quality Data for Sandusky River Material Transport Stations.
Final rept.
Aug 78, 265p
Report on Lake Erie Wastewater Management Study.

This report presents data that represents water quality information collected at nine Sandusky River material transport sampling stations for the Lake Erie Wastewater Management Study. A list of these stations along with the U. S. Geological Survey gage number and drainage area is provided. (Author9

AD-A079 758/9 PC **A09**/MF **A01**
State Univ of New York At Buffalo Dept of Civil Engineering
Historical Trends in Pollutant Loadings to Lake Erie.
Final rept. 1 Jan-1 Nov 75,
Robert P. Apmann. Nov 75, 193p
Contract DACW49-75-C-0045

This paper investigates historical trends in pollutant loadings to Lake Erie. The first of two sections of this report analyzes information on the amount of sediments delivered to Lake Erie and discusses historical trends in sediment yield. There are two primary sources of data: (1) measurements of suspended sediment load made in some of the tributary rivers and (2) analyses of shoreline erosion and sedimentation rates in Lake Erie. These lead to a subsequent analysis of the sediment budget. Since the loading of contaminants to the lake is manifested by sedimentation, results are presented of analyses of contamination inputs from bottom coring. Trends in precipitation, runoff, and lake levels have been analyzed and are presented followed by the calculation and tabulation of the average surface water runoff to Lake Erie. The second section of the report deals primarily with the sources and inputs of the two nutrients, phosphorus and nitrogen, to Lake Erie. There is little specific information on those inputs, and, therefore, information has been assembled from other locations on the sources of these nutrients. The historical growth in population in the Lake Erie Basin has also been traced.

PB80-134034 PC **A03**/MF **A01**
Oklahoma Water Resources Research Inst., Stillwater.
The Influence of Canal Seepage on Groundwater in Lugert Lake Irrigation Area.
Technical completion rept. 1 Oct 77-30 Sep 79,
D. L. Nofziger, C. E. Rice, and Sarmud Mishu.
Nov 79, 40p W80-02706, OWRT-A-080-OKLA(1)
Contract DI-14-34-0001-9038

Seepage from irrigation canals in the Lugert Lake Irrigation area has been considered a major contribution to the perched water table and to soil salinity problems in the area. This research was conducted to quantify water losses from the canals

and to determine the influence of the water losses on the soil water. Seepage rates were measured by ponding for canals less than 4 m wide. The rates ranged from 0.35 to 0.78 cm/hr (0.13 to 0.44 cu ft/sec/mi) for canals in regions with clay loam surface soils and from 1.09 to 1.24 cm/hr (0.33 to 0.48 cu ft/sec/mi) for regions with sandy loam surface soils. Water losses from the main canals accounted for up to 100% of the change in the water table elevations.

PB80-134695 PC **A06**/MF **A01**
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
A Model for Water Circulation and Solute Transport in Pool Number 2 of the Mississippi River.
Project rept.,
H. Stefan, and A. Demetracopoulos. Oct 79, 116p 186, W80-02763, OWRT-A-039-MINN(1)

Low flow water circulation in Pool No. 2 of the Mississippi River was analyzed and the resulting flow distribution was used for the computation of mass (solute) transport through the system. The study establishes a basis for dynamic water quality modelling at a very short time-scale as appropriate e.g., for dissolved oxygen or suspended solids. The river reach analyzed receives the effluent from the Metropolitan waste treatment plant (Pig's Eye Plant), but has also great recreation potential because of its proximity to the Twin Cities. Pool No. 2 of the Mississippi River has a fairly complex geometry. It was analyzed as a networkk of 17 fixed boundary segments, taking into account gravity forces, bed shear stresses, local (minor) energy losses and wind effects. The hydrodynamic equations were solved for quasi-steady state conditions. The mass transport was analyzed with a cells-in-series type model. The hydrodynamic and transport model described herein is the basis for a water quality model now under development.

PB80-134703 PC **A03**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Geology.
Geophysical Studies of the Hydraulic Properties of Glacial Aquifers in the Pawcatuck River Basin, Rhode Island,
Reinhard K. Frohlich. Nov 79, 40p W80-02770, OWRT-A-068-RI(1)

The potential of geophysical methods for groundwater exploration was studied in the Upper and Lower Wood River area of southern Rhode Island. In the area a complexity of aquifers is associated with glacial stream channels, however, only some of the aquifers are sufficiently large for groundwater use. To locate and classify these aquifers three geophysical techniques were used: a gravity survey, geophysical depth sounding, and seismic refractivity profiles. Seven geoelectrical depth soundings were conducted and sounding curves are presented. Layer velocities, thicknesses, and depth to bedrock were studied with twenty-one reversed seismic refraction profiles. None of these methods alone can identify optimal aquifer locations therefore it is recommended that all three be used to reduce or more efficiently organize exploratory drilling.

PB80-135296 PC **A06**/MF **A01**
Leman Powell Associates, Inc., Alexandria, VA.
A Process for Community Flood Plain Management.
Nov 79, 118p W80-03079, OWRT-T-0008(6707)(1)
Contract DI-14-34-0001-6707

Guidelines for the process of preparation and management of plans for the reduction and avoidance of flood damage in flood plain areas are presented. Flood plain management is the combination of appropriate measures to deal with a flooding problem in a particular area. These measures may be structural (dams, levees, floodwalls, diversions, and channel improvements) or nonstructural (land use regulations and zoning). The general planning process is described along with a review of the variety of means and tools available for flood plain management implementation.

PB80-137581 PC **A03**/MF **A01**
Geological Survey, Helena, MT. Water Resources Div.
Saline-Seep Development in the Hailstone Basin, Northern Stillwater County, Montana.
Water-resources investigations (Final),
Barney D. Lewis, Stephan G. Custer, and Marvin R. Miller. Nov 79, 36p USGS/WRD/WRI-80/005, USGS/WRI-79-107
Prepared in cooperation with Montana State Univ., Bozeman., and Montana Bureau of Mines and Geology, Butte.

As a result of an increase in saline seep occurrence in Montana, a study was begun in 1974 to determine the hydrogeology of saline seeps in the Hailstone basin in south-central Montana. The aquifer is composed of colluvium of Holocene age derived from weathering of Cretaceous rocks. The appearance and growth of saline seeps are related to precipitation patterns; the agricultural practice of summer fallow; topography; the presence of shallow, unconfined, and locally recharged groundwater system; and a soluble salt source. Continuous cropping could reduce the amount of water percolating beneath local recharge areas, and thus minimize the water available for seep formation and growth. The lateral variation in chemical quality of water from wells suggests a shallow flow system. The field specific conductance of 29 ground-water samples collected in 1976 ranged from 2,160 to 14,000 micromhos per centimeter and averaged 6,660 micromhos per centimeter. Water from saline seeps in the study area contains principally sodium, magnesium, calcium, and sulfate. The origin of salinity in the water appears to result from weathering of pyrite, carbonate minerals, and clay minerals. Nitrate is present in the ground water in concentrations of as much as 855 milligrams per liter.

PB80-137649 PC **A04**/MF **A01**
Illinois State Water Survey, Urbana.
Effect of Bottom Conditions on Eutrophy of Impoundments,
D. P. Roseboom, R. L. Evans, W. Wang, T. A. Butts, and R. M. Twait. 1979, 63p ISWS/CIR-139/79, W80-02881

Two man-made impoundments, Lakes Eureka and Canton in central Illinois, were studied to develop procedures for assessing behavior characteristics and thereby relative eutrophy of waters in man-made lakes. Likenesses and differences for the two lakes in productivity, water chemistry, and sediment oxygen demand were identified. Both lakes thermally stratify and maintain an anerobic zone in bottom strata for a 5-month period in summer; stratification is weak in the shallower Lake Eureka, but well-defined in Lake Canton. The thermal stratification of the lakes is not a barrier to the extent the anerobic zone penetrates the overlying waters. Both lakes support blue-green algae blooms. The density of algae at Lake Canton exceeds that at Lake Eureka; however, alkalinity reductions at the surface indicate algal productivity of Lake Eureka exceeds that of Lake Canton by 30%.

PB80-138266 PC **A12**/MF **A01**
Sutron Corp., Arlington, VA.
Dissolved Oxygen Impact from Urban Storm Runoff.
Final rept. 18 Nov 77-1 May 79,
Thomas N. Keefer, Robert K. Simons, and Raul S. McQuivey. Nov 79, 252p EPA-600/2-79-156
Contract EPA-68-03-2630

The primary objective of the research reported here is to determine if on a national basis a correlation exists between strength of dissolved oxygen (DO) deficits and the presence of rainfall and/or storm runoff downstream of urban areas. A secondary objective is to estimate the magnitude and extent of the problem. One hundred and four water quality monitoring sites in and downstream of urban areas throughout the country were considered for inclusion in the study. These were screened from over 1000 monitors maintained by federal and state agencies. Daily data were obtained and processed for 83 of the 104 candidate sites. Of the 83 monitors considered, 42 percent or roughly four monitors in ten of the 104 candidates demonstrated a 60 percent or greater probability of a higher than average DO deficit occurring at times of higher-than-average stream flow or on days with rainfall. In general, the data examined here indicate that 19 percent of the 104 candidate monitors might not meet a 5.0-mg/l standard and 15 percent might not meet a 2.0-mg/l standard.

PB80-138514 PC **A07**/MF **A01**
Alabama Univ., University. Bureau of Engineering Research.
Computer Simulation of Storm Surges and River Flooding in Mobile Bay.
Master's thesis,
Stephen Hu. Mar 79, 142p BER-232-112, W80-03088, OWRT-A-061-AL(2)
Prepared for Auburn Univ., AL. Water Resources Research Inst.

A modified Reid-Bodine hydrodynamic-salinity model and an open coast water model were used on the University of Alabama Univac-1110 computer system to simulate the Mobile Bay, Alabama, system under severe storm surge and/or flooding conditions. Hurricanes cause both surges in the bay and river flooding. Data input and sources are described including river flooding input data and storm surge input data with conformal mapping and storm surge equations. Model calibration and verification are also described. The model is used to describe water behavior during river flood stage as a function of river discharge rate.

PB80-139785 PC **A11**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Urban Stormwater Control Package for Automated Real-Time Systems.
Completion rept.,
John W. Labadie, Dennis M. Morrow, and Rogelio C. Lazaro. Dec 78, 232p W80-03080, OWRT-C-6174(5218)(3)

A methodology is presented for automatic computer control of in-line sewer storage as a cost-effective means of limiting water pollution for storm and combined sewer overflows. The methodology called a Stormwater Control Package (SWCP) involves the application of realistic computer models for inflow forecasting, sewer routing, and operational storage control for real-time simulated environments. Controllable in-line storage uses adjustable weirs, valves, or gates in interceptors, laterals, or outfalls to create backwater that is stored to prevent an overflow of untreated stormwater. Because rapid response is needed to deal with the complex flow characteristics occurring during a storm, automated computer control is needed. The control package is applied to San Francisco's Marina Branch of the North Shore Outfalls Consolidation Project to demonstrate SWCP's potential usefulness.

PB80-143621 PC **A04**/MF **A01**
Missouri Water Resources Research Center, Columbia.
Delineation of Buried River Valley Aquifers in Dissected Till Plains.
Completion rept. 1 Oct 78-30 Sep 79,
John M. Sharp, Jr., Morris D. Hall, Michael Bahorich, and Cynthia Keefe. 30 Nov 79, 59p W80-03302, OWRT-A-112-MO(1)
Contract DI-14-34-0001-9027

Several methods of gravity geophysics, in conjunction with drift thickness and bedrock topography maps, were used to map the location of buried river valleys in northwestern Missouri. Drift thickness varies from zero to over 100 metres within the selected study area. The buried valleys are often filled with thick sequences of glacial-fluvial deposits which can serve as important aquifers. Over 900 gravimeter readings established a grid network over the study area. Two methods were used to calculate the regional Bouguer free-air anomaly - polynomial trend surfaces of reduced gravity readings and trend surfaces defined solely by the well data. The fifth-order polynomial trend surface closely matched basement rock topography. This trend surface, along with the gravity residual and drift thickness maps, can then be used to delineate these valleys with fair accuracy. Gravity profiles were run normal to several suspected buried valleys. Several promising branch aquifers, previously unreported, are indicated.

PB80-143910 PC **A19**/MF **A01**
Geological Survey, Anchorage, AK. Water Resources Div.

Water Resources Data for Alaska, Water Year 1978.
Water-data rept. (Annual) 1 Oct 77-30 Sep 78.
Nov 79, 434p USGS/WRD/HD-80/007, USGS-WDR-AK-78-1
See also report for 1977, PB-288 964.

Water resources data for the 1978 water year for Alaska consists of records of stage, discharge, and water quality of streams; stage and water quality of lakes; and water levels and water quality in wells and springs. This report contains discharge records for 117 gaging stations; stage only records for 2 gaging stations; water quality for 64 stations; and water levels for 28 observation wells. Also included are 79 low-flow, 87 crest-stage, and 24 water-quality partial-record stations.

PB80-144579 PC **A03**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Distribution of Phytoplankton in Arizona Lakes.
Rept. for 21 Feb-11 Dec 75,
W. D. Taylor, L. R. Williams, S. C. Hern, V. W. Lambou, and F. A. Morris. Dec 79, 44p EPA-600/3-79-112
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biological Sciences.

This is a data report presenting the species and abundance of phytoplankton in the 11 lakes sampled by the National Eutrophication Survey in the State of Arizona. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

PB80-144603 PC **A03**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Distribution of Phytoplankton in Nevada Lakes.
Rept. for 21 Feb-11 Dec 75,
V. W. Lambou, F. A. Morris, M. K. Morris, W. D. Taylor, and L. R. Williams. Dec 79, 42p EPA-600/3-79-117
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biological Sciences.

This is a data report presenting the species and abundance of phytoplankton in the 10 lakes sampled by the National Eutrophication Survey in the State of Nevada. Results from the calculation of several water quality indices are also included. (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

PB80-146244 PC **A13**/MF **A01**
Geological Survey, Doraville, GA. Water Resources Div.
Floods in Georgia, Magnitude and Frequency. Techniques for Estimating the Magnitude and Frequency of Floods in Georgia with Compilation of Flood Data Through 1974.
Water-resources investigations,
McGlone Price. Oct 79, 278p USGS/WRD/WRI-80/010, USGS-WRI-78-137
Prepared in cooperation with Georgia Dept. of Transportation, Atlanta.

Regional relations are defined for estimating the magnitude and frequency of floods having recurrence intervals of 2, 5, 10, 25, 50, and 100 years on streams with natural flow in Georgia. Multiple-regression analyses were used to define the relationship between the flood-discharge frequency of annual peak discharges for streams draining 0.1 to 1,000 square miles and 10 climatological and physical basin characteristics. Individual relations of flood magnitude and frequency to drainage area are given for parts of the main stems of the major rivers without significant regulation draining more than 1,000 square miles.

8I. Mining Engineering

PAT-APPL-6-066 998 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
In-Situ Leach Mining Method and Apparatus.
Patent Application,
William C. Larson, and Roger J. Morrell. Filed 16 Aug 79, 13p PB80-139504

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is a method with its associated apparatus of in situ leach mining in which a single well head is used to inject the leaching solution and also to recover the minerals contained in the recoverable leaching solution. The well head has a main generally vertical well and a plurality of interacting branch wells that are drilled to extend outwardly therefrom at an angle of say 2 to 60 degrees to the main well. Extending down the main well is a central conduit which receives the recoverable leaching solution and minerals. A submersible pump at the lower end of the conduit may be placed within the conduit near the mineral ore zone. A packer is placed between the pump and the branch wells around and outside of the main conduit to prevent the flow of solution pass it. The outer ends of each of the branch wells extend into the ore zone and provide for the injection of the leaching solution thereto from the surface down the main well outside of its conduit. After the solution has been forced into the ore zone, a negative pressure is built up by the pump to cause the recoverable solution and minerals to be forced to the vertical well, and finally the solution is pumped to the surface via the conduit (drop pipe).

PATENT-4 173 140 Not available NTIS
Department of the Interior, Washington, DC.
Trigger Device for Explosion Barrier.
Patent,
Israel Liebman, Frank T. Duda, and Ronald S. Conti. Filed 3 Feb 78, patented 6 Nov 79, 5p PB80-139272, PAT-APPL-874 953
Supersedes PB-280 342.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A trigger device for an explosion barrier includes a pressure sensor and at least two flame sensors. The pressure sensor energizes the flame sensors in response to a predetermined pressure rise, and the explosion barrier is triggered when a flame is detected by both flame sensors. The flame sensors are oriented at different angles in order to prevent false firing by miner's lamps, etc.

PATENT-4 173 141 Not available NTIS
Department of the Interior, Washington, DC.
Method of Determining Gas Leakage Through a Mine Stopping.
Patent,
Fred N. Kissell, Slavoljub D. Maksimovic, and Joseph E. Matta. Filed 28 Nov 78, patented 6 Nov 79, 5p PB80-139199, PAT-APPL-964 416
Supersedes PB-297 625.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent relates to a method of determining the gas leakage through a mine stopping. The mine stopping, whose leakage is to be measured, is set up in a mine. Next, a test barrier is set up in the mine adjacent to the stopping. The volume between these two structures forms a closed test chamber filled with ambient gas. A known trace gas different from the ambient gas or a known contaminating gas is introduced into the chamber and mixed therein. Thereafter, periodic measurements are made of the rate of change in concentration of the tracer gas. Lastly, based upon the measured rate of change in concentration of the tracer gas, the leakage past the mine stopping is determined.

PATENT-4 180 177 Not available NTIS
Department of the Interior, Washington, DC.
Pressure Vent for Explosion-Proof Electrical Enclosures.
Patent,
Robert J. Gunderman, Keith Alcock, Charles S. Skinner, and Michael W. Riley. Filed 4 Apr 79, patented 25 Dec 79, 6p PB80-139173, PAT-APPL-6-027 133
Supersedes PB-297 612.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a vent device for relieving pressure buildup inside an electrical enclosure due to an internal explosion of gases. A mass of stainless steel foam covers an opening in the enclosure and stops any flames or particles from escaping but provides a large equivalent cross section opening to permit the gases to escape and vent the pressure buildup. An outer cover protects the foam mass from impact damage and shields it from high pressure water spray used in cleaning. The cover is vertically hung from a knife-edge and held closed by means of a permanent magnet. A predetermined pressure differential is sufficient to overcome the attractive force of the magnet and allow the protective cover to be pushed open. The device may be used in mining operations.

PATENT-4 180 352 Not available NTIS
Department of the Interior, Washington, DC.
Extensible Brattice and Cantilevered Roof Mounted Support System Therefor.
Patent,
Edward R. Divers, D. Randolph Berry, and David A. Monaghan. Filed 7 Nov 78, patented 25 Dec 79, 5p PB80-139207, PAT-APPL-958 578
Supersedes PB-292 217.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention relates in general to extensible brattices for underground mine face ventilation, and in particular to an extensible cantilevered brattice system adapted to be mounted from the roof bearing plates in room-and-pillar coal mining sections using exhaust face ventilation.

PATENT-4 180 545 Not available NTIS
Tennessee Valley Authority, Muscle Shoals, AL.
Uranium Recovery from Wet-Process Phosphoric Acid.
Patent,
John F. McCullough, John F. Phillips, Jr., and Leslie R. Tate. Filed 25 Aug 77, patented 25 Dec 79, 10p PB80-145030, PAT-APPL-827 517
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is given for recovering uranium from wet-process phosphoric acid, wherein the acid is treated with a mixture of an ammonium salt or ammonia, a reducing agent, and then a miscible solvent. Solids are separated from the phosphoric acid liquid phase. The solid consists of a mixture of metal phosphates and uranium. It is washed free of adhering phosphoric acid with fresh miscible solvent. The solid is dried and dissolved in acid whereupon uranium is recovered from the solution. Miscible solvent and water are distilled away from the phosphoric acid. The distillate is rectified and water discarded. All miscible solvent is recovered for recycle.

PB80-127152 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Dept. of Chemical Engineering.
Characterization of the Heavy Products of Coal Pyrolysis,
George R. Gavalas, and Mitsuo Oka. 1977, 15p NSF/RA-770877
Grant NSF-AER74-12161
Prepared in cooperation with California State Polytechnic Univ., Pomona.

The molecular weight and NMR spectra of heavy products from rapid pyrolysis and tetrahydrofuran (THF) extraction of one subbituminous and two bituminous coals were studied. Methodology involved heating the coals at 500C for 30 seconds under vacuum. Heavy products were dissolved in THF and analyzed by (1)H NMR spectroscopy and Gel Permeation Chromatography (GPC) in an atmospheric pressure column. Parallel GPC, (1)H NMR and (13)C NMR studies were conducted with THF extracts of the same coals. Results indicate that the elemental composition of coal corresponds more closely to its pyrolysis products than to its extracts, suggesting that pyrolysis products can be more useful than extracts in characterizing structure. NMR data of extracts and pyrozylates show a substantial increase in aromaticity with increasing rank, and that more than two-thirds of the

hydrogen belongs to aliphatic structures. Gel permeation data established the average molecular weight of three fractions. In both extracts and pyrolysis products the middle fraction with an average molecular weight of 915 represented about 50% of the product. Structural analysis indicates that product molecules from pyrolysis or extraction consist of one to six linked units.

PB80-127178 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Experimental and Modeling Studies of Coal Pyrolysis and Hydrogenation.
Final technical rept. 1 Aug 74-31 Jul 77,
G. R. Gavalas. 8 Nov 77, 11p NSF/RA-770876
Grant NSF-AER74-12161

Research objectives were to study experimentally the product distribution of various coals in a broad range of conditions and to develop a comprehensive mathematical model of coal structure and coal pyrolysis. Experimentally, a pyrolysis reactor system is described and illustrated which yielded products for characterization by pressure gel permeation chromatography, NMR, and elemental analysis. Kinetics of gaseous product formation was studied indicating that (1) product distribution is highly sensitive to pyrolysis temperatures, (2) particle size is a minor factor, and (3) pressure has a significant effect. A chemically based model of coal pyrolysis was developed that incorporates several features. First, coal is regarded as a collection of functional groups by which each coal is characterized. Second, chemical reactions selected on the basis of organic chemical theory and thermochemistry include bond dissociation and recombination, hydrogen abstraction, and free radical addition to aromatic rings. Third, mass transfer has been taken into account within both the microporous structure and transitional pores and macropores. A new computer code is being developed.

PB80-131600 PC **A08**/MF **A01**
California Univ., Riverside. Dry Lands Research Inst.
Geographical and Environmental Analysis.
Final rept.,
M. J. Pasqualetti. Jan 77, 175p DLRI-11, NSF/RA-770742
Grant NSF-AER75-08793
Sponsored in part by Department of Energy, Washington, DC.

Interim conclusions are made regarding the potential environmental impact from geothermal resource development in the Imperial Valley. Location of geothermal transmission lines, water desalination of geothermal fluids, and geothermal brines and their recovery in the Imperial Valley are covered also.

PB80-131618 PC **A02**/MF **A01**
California Univ., San Diego, La Jolla.
Observations on the Role of Cavitation in Electric Spark Rock Drilling.
A. T. Ellis, and J. E. Starrett. 1975, 8p NSF-RA-N-75-468
Grant NSF-APR75-15814

The cavity or bubble formed by an electric spark is nearly identical to that of cavitation caused by variation of pressure as far as bubble dynamics are concerned. For application to rock fragmentation, all three aspects of spark bubble generation are desirable: the initial spark shock wave, the high velocity liquid jet impact during collapse, and the shock wave at the end of bubble collapse or rebound. The preliminary work here reported is an attempt to evaluate the relative importance of these different mechanisms with a view to overall optimization of spark drilling. The laboratory experiments described were performed to observe damage mechanisms at low pressure and low energies in water. It was felt that these experiments showed clearly that the greatest fracturing would occur from cavitation bubble jet impact rather than from shock waves, that is, at least for voltages up to 14,000 volts. Another aspect of the damage which is typical cavitation is that rather deep, small diameter holes are produced. These are most effective at initiating crack propagation in their later phases which could lead to more efficient fragmentation.

PB80-134539 PC **A02**/MF **A01**
Bureau of Mines, Denver, CO. Denver Mining Research Center.
Long-Term Rock Noise Plotting Techniques.
Rept. of investigations 1979,
Richard C. Repsher, and D. Jan Black. 1979, 15p BUMINES-RI-8399

Intermittent mining in the slope section at Dutch Creek No. 1 mine, Carbondale, Colo., of the Mid-Continent Coal and Coke Co. has resulted in erratic and minimal rock noise data, which, in turn, has necessitated a change in the method used to plot daily mine noise in order to be useful to the researchers at the mine. Daily and weekly cumulative plots of rock noise under these conditions have not shown significant stress changes as clearly as bimonthly or longer noise rate plots. Hence, longer term cumulative rock noise plots, as described in this Bureau of Mines report, have been added to the data analysis at Dutch Creek No. 1 mine, and have been shown to delineate unique areas of rock noise activity more clearly than shorter term plots. The longer term plots should aid in the detection and delineation of potential failure areas, when used in conjunction with other proven forms of data analysis.

PB80-134570 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Triggered Barriers for the Suppression of Coal Dust Explosions.
Rept. of investigations 1979,
I. Liebman, J. K. Richmond, R. Pro, R. Conti, and J. Corry. 1979, 30p BUMINES-RI-8389

Two triggered barrier systems and several extinguishing agents were tested against coal dust explosion propagating in the main entry of the Bureau of Mines Experimental Mine at Bruceton, Pa. One system used a high-pressure cylinder to propel the extinguishant; the second system used pressurized nitrogen gas or Halon 1301 (CF_3Br) in a low-pressure system to power the disperser. The relative efficiencies of the extinguishants were determined by comparing calculated concentrations of the extinguishant clouds present in the mine during suppressing of the explosions. Results showed the following trend of increasing effectiveness: Purple-K ($KHCO_3$) < water < hybrids consisting of foam or water combined with Halon 1301 < Halon alone. On a weight basis, water was two to three times as efficient as Purple-K, whereas the hybrids and Halon alone were only marginally superior to water. Maximum efficiency of an extinguishant is attained by high rates of discharge from the barrier and by minimizing the time interval between onset of discharge and flame arrival to that necessary for discharge. Both the high- and low-pressure barrier systems were demonstrated to be capable of suppressing coal dust explosions; however, because of the potential hazard of the former, the low-pressure system is considered to be the most attractive prototype.

PB80-137862 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Correction Factors for Low-Velocity Airflow Measurements in Mines.
Rept. of investigations 1979,
Edward D. Thimons, Slavoljub D. Maksimovic, and Fred N. Kissell. 1979, 20p BUMINES-RI-8400

The Bureau of Mines conducted in-mine tests to determine correction factors applicable to low-velocity airflows (below 150 fpm) measured by the smoke cloud, vane anemometer, and oil of wintergreen tracer gas techniques. The average correction factors found for these methods of measurement were lower than those reported in the literature for use with higher velocity measurements. All tests measured airflows with controlled average velocities ranging from 50 to 100 fpm. Correction factors averaged about 0.75 for readings taken by the centerline smoke cloud method, remotely controlled and stickheld centerline anemometer, and split traverse stick-held anemometer. For hand-held centerline anemometer and Oil of wintergreen tracer gas readings, correction factors averaged about 0.67. Since special anemometers are needed to measure airflows in this low-velocity range, and since proper calibration of these anemometers is difficult and expensive, the use of anemometers for low-velocity measurement is impractical. On the other hand, smoke and oil of wintergreen give results as consistent as those obtained with specially calibrated, low-velocity anemometers. Furthermore, they are easy to use and inexpensive.

PB80-140205 PC **A05**/MF **A01**
Allen Corp. of America, Alexandria, VA.
An Annotated Bibliography of Coal Mine Fire Reports. Volume I.
Final rept. 30 Sep 77-31 Jul 78,
L. Bruce McDonald, and Robert M. Baker. 15 Feb 79, 93p BUMINES-OFR-7(1)-80
Contract J0275008
See also Volume 2, PB80-140213.
Also available in set of 3 reports PC E19, PB80-140197.

This three-volume report describes the method whereby data was gathered and analyzed on coal mine fire reports. The primary objective of the program was to develop an annotated bibliography of coal mine fire reports (1950-77). Two additional objectives were to gather data on nonreportable fires and to conduct statistical analyses on the data to delineate trends. The report does not include explosions or ignitions or fires that resulted from explosives. Data was acquired from three major sources: periodicals, MSHA (Mining Safety and Health Administration) fire reports, and mine safety directors. The primary data source was MSHA fire reports contained in the files of MSHA coal mine health and safety district and subdistrict offices. Data were separated into reportable fires (at least 30 minutes duration or injury), nonreportable fires, and opinion data. The data were then analyzed by time trends, State, ignition source, burning substance, location, equipment, detection, duration, injuries, fatalities, and successful extinguishing agents. Volume I contains data acquisition procedures, data analysis procedures, and conclusions and recommendations.

PB80-140213 PC **A17**/MF **A01**
Allen Corp. of America, Alexandria, VA.
An Annotated Bibliography of Coal Mine Fire Reports. Volume II.
Final rept. 30 Sep 77-31 Jul 78,
L. Bruce McDonald, and Robert M. Baker. 15 Feb 79, 400p BUMINES-OFR-7(2)-80
Contract J0275008
See also Volume 1, PB80-140205 and Volume 3, PB80-140221.
Also available in set of 3 reports PC E19, PB80-140197.

This paper is volume II of a three-volume report on underground and surface coal mine fires occurring between 1950 and 1977. The report contains (1) a master list of all fire incidents obtained from MSHA (Mine Safety and Health Administration) reports; (2) an annotated bibliography of all MSHA reports, journal articles on selected incidents, and nonreportable fires; and (3) indexes to be used in accessing incidents in the master list and annotated bibliography. These three types of information provide a complete summary of coal mine fires during the program and a convenient means to locate incidents of specific interest.

PB80-140221 PC **A99**/MF **A01**
Allen Corp. of America, Alexandria, VA.
An Annotated Bibliography of Coal Mine Fire Reports. Appendix.
Final rept. 30 Sep 77-31 Jul 78,
L. Bruce McDonald, and Robert M. Baker. 15 Feb 79, 654p BUMINES-OFR-7(3)-80
Contract J0275008
See also Volume 2, PB80-140213.
Also available in set of 3 reports PC E19, PB80-140197.

This report is the appendix of a three-volume report. The appendix is intended to be used in conjunction with the tables and indexes contained in volume II of this report, and as such should be considered an integral part of volume II. The indexes in the body of volume II provide a means of ready reference to the underground and surface mine incident report forms. For those readers with interests other than those indexed, tables II-1a and II-1b can be used to locate specific incidents of interest. Complete incident information can then be ob-

tained from the corresponding report forms in the first two sections of this appendix.

PB80-140544 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Upper Darby, PA.
Avoid Problem Spoils Through Overburden Analysis.
General technical rept.,
Thomas L. Despard. 1974, 8p NEFES-80-4, FSGTR-NE-10

During strip mining of coal and subsequent grading operations, indiscriminant placement of toxic overburden strata at the spoil surface creates reclamation problems that are difficult and expensive to correct. Evaluation of overburden material before mining is begun is suggested as the most reliable means of predicting spoil quality and devising a reclamation plan.

PB80-143027 PC **A12**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Evaluation of Roof Conditions from Bolting Machine Parameters.
Open file rept. Sep 77-Sep 78 (Final),
Richard W. Lusignea, and Kenneth R. Maser. Sep 78, 252p BUMINES-OFR-97-79
Contract J0275021
Color illustrations reproduced in black and white.

This report describes a program to evaluate the feasibility of determining roof features that occur in U.S. coal mines from changes in bolting machine drilling parameters. The ultimate purpose of this effort is the development of an instrumented roof bolting machine that can detect hazardous roof conditions and/or indicate when the existing roof control plan is inadequate. A survey of hazardous conditions occurring in U.S. coal mines is included, along with the slang expressions for these conditions, and their relative degree of hazard. Specific machine parameters are proposed using readily available instrumentation in most cases. Various systems are evaluated and tradeoffs presented. An implementation plan is proposed for developing a prototype system and using it in an operating coal mine.

PB80-145048 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Costs of Strip Mine Reclamation in the West.
Rural development research rept.,
Kenneth L. Leathers. Feb 80, 89p RDRR-19

Estimated costs of mined land reclamation averaged $3,500 per acre in 1976 for western coal regions, an average of 5 cents per ton of coal produced and less than 1 percent of mine mouth coal prices. Improvements in reclamation practices as a result of 1977 Federal legislation, as well as inflation, will boost these costs. Earthmoving and reshaping account for about 70 to 80 percent of total reclamation costs at a mine.

PB80-149487 PC **A08**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Eastern Field Operation Center.
Demonstrated Reserve Base of U.S. Coals with Potential for Use in the Manufacture of Metallurgical Coke.
Information circular,
William S. Sanner, and David C. Benson. 1979, 165p BUMINES-IC-8805

A demonstrated reserve base (DRB) of bituminous coal suitable for cokemaking has been estimated based on the latest published information on U.S. coal reserves. Bureau of Mines analyses of raw coalbed samples were used to classify the coals as low-, medium-, and high-volatile bituminous and grade them as premium, marginal, and latent coking coals. Coal rank was used as the basis for identifying coking coals, and ash and sulfur content were used to determine coking coal grade.

8J. Physical Oceanography

AD-A079 624/3 PC **A03**/MF **A01**
Synectics Corp Rome NY
Bathymetric Data Reduction Subsystem.
Final technical rept. Aug 76-Oct 78,
P. Bell, and R. Howarth. Sep 79, 49p C-T0756-W, RADC-TR-79-212
Contract F30602-76-C-0412

The subject final technical report covers Phase I - the Basic Operating Capability of the Bathymetric Data Reduction Subsystem. The report discusses and evaluates problems encountered during Phase I and the solutions which Synectics Corporation provided to these problems. There are four parts to this report. First, a discussion of problems which is basically mathematical. Secondly, discussion of software accomplishments pertain to subsystem development. Part III, method of inaccuracies occurring in data input and manipulation are discussed. Finally, the fourth part evaluates the scope and limitations of the hardware configuration along with system software provided by Data General Corporation. (Author)

AD-A079 674/8 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Scattering from Oceanic Microstructure: Detection with a Large Aperture Array.
Summary rept.,
G. Thomas Kaye, and Victor C. Anderson. 27 Nov 78, 16p Rept no. MPL-U-78/78
Contracts N00014-75-C-0749, N00014-76-C-0549
Pub. in the Jnl. of the Acoustical Society of America, v66 n3 p842-849 Sep 79.

No abstract available.

AD-A079 697/9 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Interactive Digital Satellite Image Processing System for Oceanographic Applications.
Final rept.,
Albert E. Pressman, and Ronald J. Holyer. Apr 78, 18p Rept no. NORDA-TN-23

The NORDA oceanographic satellite remote sensing program will emphasize data exploitation as opposed to data collection. This emphasis is because the collection technology has already far outstripped our ability to utilize the data for oceanographic purposes. The satellite data system described herein is an essential component for development and demonstration of processing, analysis, and interpretation methodology. The NORDA system includes a near real-time capability to receive GOES and limited VHRR data for screening purposes.

AD-A079 817/3 Not available NTIS
Washington Univ Seattle Dept of Oceanography
Oceanographic Atlas of the Bering Sea Basin.
Interim rept. 1 Oct 76-30 Sep 79,
Myron A. Sayles, Knut Aagaard, and L. K. Coachman. 31 Dec 79, 167p Rept no. TR-17
Contract N00014-75-C-0893, Grant NSF-GA-1126
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Sponsored in part by Grant NSF-GA-11147.
Availability: University of Washington Press, Seattle HC $25.00 (No copies furnished by DTIC).

This annotated oceanographic atlas of the deep Bering Sea basin pays particular attention to seasonal changes in temperature, salinity and density. It includes a seasonal volumetric water mass census, horizontal distributions, dynamic topography, and vertical sections. There are 5 tables and 140 plates.

AD-A079 832/2 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
The NORDA Hemispheric Mixed Layer Model System (HMLMS): A Functional Description.
R. Michael Clancy. Apr 79, 27p Rept no. NORDA-TN-45

This technical note describes a forecast model for the thermal structure of the upper ocean developed for Fleet Numerical Weather Central (FNWC) by NORDA Code 322. Brief discussions of the capabilities and limitations of the model, its software design, and its impacts on and interfaces with the FNWC operational system are given. (Author)

AD-A079 885/0 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity Nstl Station MS
Northern Smith Sound Oceanography - Summer 1977.
Final rept.,
Samuel G. Tooma. Mar 78, 28p Rept no. NORDA-TN-21

An oceanograpic research program was conducted in northern Smith Sound during the middle July 1977 using USCGC WESTWIND (W-AGB 281) as the data collection platform. One aspect of the program was to investigate the water mass interactions at the narrowest portion of Smith Sound which: (1) represents the boundary between this sound and Kane Basin to the north; and (2) is the area of the most well-known semipermanent open water area--the North Water Polynya. From an analysis of 2 West-East cross sections and a comparison of these data with data collected by the Coast Guard in 1963, it is suggested that the northern Smith Sound area is a meeting area of two different water masses: (1) a warm (>-1.0 C), dense (>26.8 sigma sub t) mass on the eastern side of Smith Sound which enters the area from the south; and (2) a cold (<-1.0 C), low density (<26.7 sigma sub t) mass on the western side of Smith Sound which originates in the Arctic. It is further suggested that since the warm, dense water mass was also observed in 1963, this feature in eastern Smith Sound may be a permanent or, more likely, a semipermanent (seasonal) phenomenon and could be highly modified Atlantic Water. This latter conclusion is in contrast to the general belief that Atlantic Water does not enter Smith Sound.

AD-A079 886/8 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Thermistor Array Impedance Considerations.
Technical note,
Clifford R. Holland. Jun 78, 17p Rept no. NORDA-TN-26

This study examines the effects of cable resistance changes on temperature measurement accuracy when using a typical thermistor array for ocean temperature measurements. The analysis demonstrates that while some of the effects can be calculated or calibrated out, the major effects of insulation leakage can not be so corrected. Depending on choice of thermistor, measurement errors as large as a few degrees Celsius are possible, with errors of a few tenths of a degree Celsius likely. Even with great care, errors of a few hundredths of a degree Celsius are probable. To avoid sensitivity to cable impedance changes, it is strongly recommended that appropriate signal conditioning electronics be utilized at the thermistor sensor. The use of signal conversion and line driving electronics will insure that the accuracy of measured parameters will be maximally preserved during transmission to the output end of the array. (Author)

AD-A080 033/4 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Exposure. A Newsletter for Ocean Technologists. Volume 7, Number 5.
Technical rept.,
Roderick Mesecar. Nov 79, 9p
Contract N00014-79-C-0004

Contents: AXBT's for Oceanic Measurements, and Electromechanical Swivel Termination.

N80-16406/4 PC **A08**/MF **A01**
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, MS.
Radiative Transfer Modeling Applied to Sea Water Constituent Determination.
K. H. Faller. Dec 79, 171p NASA-TM-72736

Optical radiation from the sea is influenced by pigments dissolved in the water and contained in discrete organisms suspended in the sea, and by pigmented and unpigmented inorganic and organic particles. The problem of extracting the information concerning these pigments and particulates from the optical properties of the sea is addressed and the properties which determine characteristics of the radiation that a remote sensor will detect

and measure are considered. The results of the application of the volume scattering function model to the data collected in the Gulf of Mexico and its environs indicate that the size distribution of the concentrations of particles found in the sea can be predicted from measurements of the volume scattering function. Furthermore, with the volume scattering function model and knowledge of the absorption spectra of dissolved pigments, the radiative transfer model can compute a distribution of particle sizes and indices of refraction and concentration of dissolved pigments that give an upwelling light spectrum that closely matches measurements of that spectrum at sea.

PB80-134760 PC **A12**/MF **A01**
Washington Univ., Seattle. Applied Physics Lab.
Hydrographic and STD Data Collected Abroard Ara Islas Orcadas During F DRAKE 75.
Data rept.,
R. B. Weam. Jr, S. W. Hager, and L. S. Green.
Jun 79, 262p APL-UW-7913, NSF-IDOE-79-131
Grant NSF-OCE76-24597

The hydrographic and STD station data gathered aboard ARA Islas Orcadas cruise 4 to the Drake Passage region in January and February 1975 as part of the F DRAKE 75 field experiment is presented. Standard procedures for collection and processing of the data are documented. A map of station positions is shown and the data are presented in tabular and plot form.

PB80-141799 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Construction of PARFLUX Mark II Sediment Trap; Engineering Report.
Technical rept.,
Susumu Honjo, and John F. Connell. Nov 79,
54p WHOI-79-80
Grants NSF-OCE76-82063, NSF-OCE77-27004

In order to assess the fluxes of particles sinking through the deep water column a large, open ocean applicable sediment trap has been developed. The trap opening is 1.5 sq m and consists of 94 hexagonal buffer cells with the nominal form ratio of 2. Sediment particles are concentrated to the receiving cup located at the bottom of the funnel-shaped trap. Two types of receiving cups have been developed; a trap with Type S cup is open at both ends as it sinks to the designated depth. The receiving cup moves into alignment with the funnel automatically to store the sediment. At the end of deployment, an electrical signal moves the receiving cup again to seal the collected sample and leave the funnel open at both ends while the trap is recovered. Type C mechanism is installed with a shutter which seals the cup during recovery; it involves a simple mechanism. Sodium azide/sodium chloride solution is diffused through a series of membrane filters to keep the cup contents in an aseptic condition.

8K. Seismology

AD-A079 658/1 PC **A05**/MF **A01**
University of Southern California Los Angeles Geophysical Lab
Crustal and Upper Mantle Velocity and Q Structures of Mainland China.
Semi-annual technical rept.,
Ta-liang Teng. Oct 78, 86p AFOSR-TR-80-0002
Contract F49620-76-C-0010, ARPA Order-3291
See also report dated Nov 79, AD-A079 659.

New data from the Seismological Research Observatory (SRO) is used in conjunction with a nonlinear least squares technique to invert surface wave group velocity data for the shear velocity structure of the South-China subplate. A multi-filter analysis was used to produce group velocities for the fundamental mode Love and Rayleigh wave. A number of earthquakes over a single path are used in order to deduce a measure of the observational uncertainty of the present method. Group velocity standard deviations range from .03 to .1 km/sec for Love waves over the period range of 10 to 65 seconds. Results of the inversion indicate that a 3 layer, 40 km thick crust is an adequate model consistent with the data for the South-China subplate. Crustal shear velocities are found to be higher and upper mantle shear velocities lower than previously reported values for this region. (Author)

AD-A079 659/9 PC **A04**/MF **A01**
University of Southern California Los Angeles Geophysical Lab
Crustal and Upper Mantle Velocity and Q Structures of Mainland China.
Semi-annual technical rept.,
Ta-liang Teng. Nov 79, 69p AFOSR-TR-79-1319
Contract F49620-76-C-0010, ARPA Order-3291
See also report dated Oct 78, AD-A079 658.

Repeated surface wave group velocity measurements over the same paths were made by using large aftershocks of several great (M greater than 7) earthquakes recently occurred in China. Multiple filter technique was applied to the properly rotated three-component digital data from Seismological Research Observatory (SRO) stations, so that both Rayleigh- and Love-wave dispersion data were obtained over a number of path crossing various tectonic provinces of China. In several cases, higher mode data were also derived. An estimate of uncertainty of these dispersion data was obtained from the repeated measurements with identical source-receiver geometry. The generalized surface wave inversion technique was applied to these multi-mode dispersion data, and crustal and upper mantle structures were derived for various tectonic provinces of China. The results clearly demonstrate that the Chinese Mainland is far from being laterally homogeneous, the lateral heterogeneities closely reflect the tectonic developments in the recent past. A particularly unusual crustal and upper mantle structure is found underlying the Tibet plateau. (Author)

AD-A079 743/1 PC **A07**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Marine Seismic Display Enhancement Program. Volume II. Processing Software.
Final rept.,
Bruce E. Eckstein. Dec 77, 146p Rept no. NORDA-TN-14
See also Volume 3, AD-A079 753.

This document describes the processing software programs developed under the Marine Seismic Display Enhancement Program. These programs provide the geophysicists and acousticians with software to enhance marine seismic profiling data. This report contains a general software program description, UNIVAC 1108 computer listing, and the operation procedure for each program. Software to decode the Seismic Data Acquisition System's data, to process the data, and to prepare the data for playback on the Seismic Data Display System is included. Required modifications to the UNIVAC 1108 computer listings for operation on the CDC 6600 are given. This volume explains six software programs developed to enhance display of digitally recorded seismic data. The first two programs are digital filters which remove undesired frequency content from seismic data, the third vertically stacks several records with the same source to hydrophone array distance resulting in improved signal-to-noise. The fourth program is an optimum least squares filter commonly known as the 'Wiener Filter'; the fifth develops a band limited zero-phase time domain pulse with defined frequency content and the sixth develops a spectral analysis routine for time series data by use of a fast fourier transform method.

AD-A079 753/0 PC **A04**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Marine Seismic Display Enhancement Program. Volume III. Users Handbooks, Seismic Data Acquisition System (SDAS), Seismic Data Display System (SDDS).
Final rept.,
Bruce E. Eckstein, and Martin G. Fagot. Jan 78,
73p Rept no. NORDA-TN-15
See also Volume 2, AD-A079 743.

This report describes, in a users handbook format, the operation of hardware systems used to acquire and playback seismic profiling data. The Seismic Data Acquisition System digitizes 1 to 16 channels of analog seismic information and records this data on magnetic tape. This digital data has a maximum dynamic range of 72 dB and maximum sample rate of 10 KHz divided by the number of channels. Record lengths up to 15 seconds with a maximum record delay, before digitizing, of 15 seconds may be selected. Maximum signal level for the system is plus or minus 10 volts. The seismic Data Display System converts a 36 dB dynamic range digital signal to an analog signal having a maximum level of plus or minus 10 volts. The digital information displayed will contain 2000 data points per record. The system has the capability to display seismic data on a line scan intensity modulated recorder, an X-Y recorder, or a high speed fiber optic recorder. Included as appendices are schematic diagrams of the acquisition and display hardware. (Author)

AD-A079 917/1 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
State-of-the-Art for Assessing Earthquake Hazards in the United States. Report 15. Tsunamis, Seiches, and Landslide-Induced Water Waves.
Miscellaneous paper,
James R. Houston. Nov 79, 86p Rept no. WES-MP-S-73-1-15
See also report 16 dated Nov 79, AD-A079 918.

State-of-the-art methods are presented to assess the hazards of tsunamis, seiches, and landslide-induced water waves in the United States. Tsunami hazard maps for the United States are shown that display tsunami elevation zones that have a 90 percent probability of not being exceeded in a 50-year period. Methods used to determine forces exerted on structures by tsunamis are described. Hydrodynamic aspects of seiches and landslide-induced water waves are discussed, as well as methods of assessing the hazards associated with these phenomena. (Author)

AD-A079 918/9 PC **A06**/MF **A01**
Saint Louis Univ MO Dept of Earth and Atmospheric Sciences
State-of-the-Art for Assessing Earthquake Hazards in the United States. Report 16. The Relation of Sustained Maximum Ground Acceleration and Velocity to Earthquake Intensity and Magnitude.
Miscellaneous paper,
Otto W. Nuttli. Nov 79, 105p WES-MP-S-73-1-16
Contract DACW39-78-C-0072
See also report 15 dated Nov 79, AD-A079 917.

Sustained maximum ground acceleration and velocity are measures of the strongest prolonged, rather than peak, acceleration and velocity. In this report the sustained maximum ground acceleration, velocity and duration are given for the accelerograms contained in the California Institute of Technology collection, Parts A-Y. Correlations are presented between sustained maximum acceleration, velocity and the product of acceleration and duration versus MM intensity. In order to compare western United States earthquakes with earthquakes occurring in other parts of the world, relations are developed between the local and Richter magnitude scales and the more universal body-wave and surface-wave magnitude scales. The fall-off of ground acceleration and velocity as a function of distance from the fault rupture and body-wave magnitude is determined for western United States, coastal California and central United States earthquakes. The logarithm of the sustained maximum acceleration is shown to scale as 0.5 times the body-wave magnitude, and the logarithm of the sustained maximum velocity is shown to scale as the body-wave magnitude. The vertical components of ground acceleration and velocity are found to have very nearly one-half the amplitude of the larger of the two horizontal components of strong ground motion for western United States earthquakes.

AD-A079 982/5 PC **A03**/MF **A01**
Rondout Associates Inc Stone Ridge NY
Regional Seismic Wave Propagation.
Semiannual technical rept. no. 3, 1 Jan-30 Jun 79,
Paul W. Pomeroy. 31 Jul 79, 43p 03-79-1, AFOSR-TR-79-1331
Contract F49620-78-C-0043, ARPA Order-3291

The research reported here was carried out to enhance our understanding of seismic wave propagation at regional distances in the central portion of the USSR. Results in this region are contrasted with those from the Western USSR and with data from eastern North America.

PB80-146095 PC **A04**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Historical Seismogram Filming Project: First Progress Report,
H. Meyers, and W. H. K. Lee. Nov 79, 75p SE-22, NOAA-79122605
Sponsored in part by Geological Survey, Menlo Park, CA. Office of Earthquake Studies.

World Data Center A for Solid Earth Geophysics is engaged in a project of microfilming historical seismograms (1897 to 1963) and related data from a global distribution of stations. This project was initiated in response to the concern of many seismologists that the older seismograms are deteriorating, not very accessible, and in some cases lost. The older records are becoming very important for assessing seismicity of a region and analyzing earthquakes. This report describes the criteria for selection of data to be filmed and the current status of the project.

8L. Snow, Ice, and Permafrost

AD-A079 755/5 PC **A04**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
An Evaluation of Side Looking Radar Imagery of Sea Ice Features and Conditions in the Lincoln Sea, Nares Strait, and Baffin Bay.
Final rept.,
R. D. Ketchum, Jr. Apr 77, 54p Rept no. NORDA-TN-7

Evaluation of synthetic aperture radar sea ice imagery has shown that discrimination of first season ice types can be difficult due to ambiguous radar returns. It has been hypothesized that varying balances of ice thickness, snow depth, air temperature, and time will produce conditions at the snow-ice interface which are conducive to the development of radar reflective suraces with variable backscatter characteristics. The presence of this phenomenon was common in Baffin Bay where climatic conditions fluctuate widely. This phenomenon should be anticipated in other areas of the marginal ice zone. Multi-year ice forms were easy features to identify. Generally uniform returns from multi-year ice are believed to be due to volume scattering. Many of the larger frozen melt ponds on multi-year ice were identifiable. It is hypothesized that the radar energy penetrates the fresh water ice which comprises these ponds and is attenuated in the underlying multi-year ice. High returns seen within some of these ponds are believed to come from areas where thaw holes formed during the previous melt season. The question of the penetrability of large vertical sections of multi-year ice, particulary by longer wavelengths, is raised. This question deserves serious consideration because of the possible implication on air to submarine communication. (Author)

AD-A079 884/3 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Compactness Effects on Drift of Arctic Pack Ice.
Technical note Apr 76-Mar 77,
S. I. Pai, M. M. Das, and Huon Li. Mar 77, 13p Rept no. NORDA-TN-3

The exact equation of compactness of sea ice is derived from the two-phase flow theory. The equation is compared with other approximate equations of compactness of sea ice in the literature and the improvement on the understanding of compactness effect is shown. The semi-empirical formula obtained by using simplified solutions of Fel'zenbaum (1958), while agreeing well with the empirical formula for wind drift of ice, shows the effects of compactness as well. (Author)

AD-A080 051/6 PC **A02**/MF **A01**
Montana State Univ Bozeman
An Analysis of Plastic Shock Waves in Snow,
Robert L. Brown. Nov 79, 23p CRREL-79-29
Grant DAAG29-78-G-0089

An analytical study of the propagation of shock waves in snow was carried out to evaluate the response of medium density snow to high rates of loading. One solution was developed for steady shock waves; this resulted in calculation of pressure jump, density jump and stress wave speed. Correlation with available experimental data was found to be good. Nonsteady shock waves were also considered in order to evaluate wave attenuation rates in snow. Very few data were available to compare with the analytical results, so no definite conclusions on the part of the study could be made. The results show, however, that shock waves that produce plastic deformation attenuate at extremely high rates and that differences in pressure between two waves are quickly eliminated within a short distance. Calculations were also made to evaluate the effect of wave frequency on attenuation rates. The results show that, for plastic waves, frequency is not a predominant factor for determining attenuation rates. (Author)

E80-10046 PC **A07**/MF **A01**
Maryland Univ., College Park. Dept. of Civil Engineering.
Relationship of Physiography and Snow Area to Stream Discharge.
Final rept. 1 Nov 76-31 May 79,
Richard H. McCuen, and Mark E. Hawley. Oct 79, 147p NASA-CR-162506
Grant NGR-21-002-399

The author has identified the following significant results. A comparison of snowmelt runoff models shows that the accuracy of the Tangborn model and regression models is greater if the test data falls within the range of calibration than if the test data lies outside the range of calibration data. The regression models are significantly more accurate for forecasts of 60 days or more than for shorter prediction periods. The Tangborn model is more accurate for forecasts of 90 days or more than for shorter prediction periods. The Martinec model is more accurate for forecasts of one or two days than for periods of 3,5,10, or 15 days. Accuracy of the long-term models seems to be independent of forecast data. The sufficiency of the calibration data base is a function not only of the number of years of record but also of the accuracy with which the calibration years represent the total population of data years. Twelve years appears to be a sufficient length of record for each of the models considered, as long as the twelve years are representative of the population.

PB80-131543 PC **A03**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Winter Ice Jams on the Gunnison River,
Phil H. Burgi. Feb 79, 38p REC-ERC-79-4

The formation, transport, and accumulation of ice is an annual occurrence on many rivers. This report summarizes winter observations conducted on a mountain river in the State of Colorado. The Gunnison River observations were conducted along the 14-km reach of river from the Blue Mesa Reservoir upstream to the city of Gunnison, Colorado, at an elevation of 2300 m. Several variables affecting ice jam formation, such as channel morphology, climatological data, upstream and downstream reservoir operation, and river snagging and cleaing operations are analyzed for the river reach observed.

PB80-144553 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Ice Forces on the Yukon River Bridge-1978 Breakup.
Final rept.,
P. R. Johnson, and T. T. McFadden. Feb 79, 49p FHWA-RD-79-82
Contract DOT-FH-41-11-8073

The research program, of which the work described in this report is an initial part, has several interrelated objectives. The first is to develop equipment and techniques for measuring ice forces on existing river structures, particularly bridge piers. The second objective is to obtain measurements of ice forces on the Yukon River bridge. The third is to use this information to predict ice loads on other river structures.

8M. Soil Mechanics

AD-A079 699/5 PC **A02**/MF **A01**
Abcor Inc Wilmington MA Walden Div
Lead: Preliminary Pollutant Limit Value for Lead Compounds in Soil.
Technical rept. Feb-May 79,
David R. Cogley. May 79, 15p
Contract DAMD17-77-C-7050

A preliminary pollutant limit value (PPLV) of 42 mg-Pb/kg-soil has been calculated for lead compounds in soil. The solubilities of two compounds of interest to the Army, lead azide, and lead chromate, exceed the 1979 proposed water quality criterion for lead; these compounds could produce toxic effects in humans at soil concentrations which exceed the PPLV. (Author)

AD-B006 844/5 PC **A08**/MF **A01**
California Research and Technology Inc Woodland Hills
Numerical Analysis of DNA Earth Penetrator Experiment at DRES.
Final rept. 22 Apr-10 Oct 74,
M. H. Wagner, K. N. Kreyenhagen, and W. S. Goerke. 18 Jun 75, 161p CRT-2050-2, DNA-3537F
Contract DNA001-74-C-0222
Distribution limitation now removed.

A finite difference Lagrangian code calculation fo the firing of an earth penetrator into a soft soil site has been carried out. The penetrator was a 400-lb, 6.5-in. diameter steel projectile with an initial velocity of 500 ft/sec. The field tests were conducted in July 1974 at the DRES Site in Canada. The penetrator was treated as a ridig body in the code solution. A four-layer idealization of the target site was used.

N80-16403/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Dielectric Properties of Soil-Water Mixtures at Microwave Frequencies.
J. R. Wang. Dec 79, 24p NASA-TM-80597
Subm-Submitted for Publication.

Recent measurements on the dielectric constants of soil-water mixtures show the existence of two frequency regions in which the dielectric behavior of these mixtures was quite different. At the frequencies of 1.4 GHz to 5 GHz, there were strong evidences that the variations of the dielectric (epsilon) with water content (W) depended on soil type. While the real part of epsilon for sandy soils rose rapidly with the increase in W, epsilon for the high-clay content soils rose only slowly with W. As a consequence, epsilon was generally higher for the sandy soils than for the high-clay content soils at a given W. On the other hand, most of the measurements at frequencies 1 GHz indicated the increase of epsilon with W independent of soil types. At a given W, epsilon' (sandy soil) approximately equals epsilon (high-clay content soil) within the precision of the measurements. These observational features can be satisfactorily interpreted in terms of a simple dielectric relaxation model, with an appropriate choice of the mean relaxation frequency f(m) and the range of the activation energy (beta). It was found that smaller f(m) and larger beta were required for the high-clay content soils than the sandy soils in order to be consistent with the measured data.

N80-16404/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
L-Band Radar Sensing of Soil Moisture.
A. T. C. Chang, S. Atwater, V. V. Salomonson, J. E. Estes, and D. S. Simonett. Jan 80, 32p NASA-TM-80628
Subm-Submitted for Publication.

The performance of an L-band, 25 cm wavelength imaging synthetic aperture radar was assessed for soil moisture determination, and the temporal variability of radar returns from a number of agricultural fields was studied. A series of three overflights was accomplished over an agriculutural test site in Kern County, California. Soil moisture samples were collected from bare fields at nine sites at depths of 0-2, 2-5, 5-15, and 15-30 cm. These gravimetric measurements were converted to percent of field capacity for correlation to the radar return signal. The initial signal film was optically correlated and scanned to produce image data numbers. These numbers were then converted to relative

return power by linear interpolation of the noise power wedge which was introduced in 5 dB steps into the original signal film before and after each data run. Results of correlations between the relative return power and percent of field capacity (FC) demonstrate that the relative return power from this imaging radar system is responsive to the amount of soil moisture in bare fields. The signal returned from dry (15% FC) and wet (130% FC) fields where furrowing is parallel to the radar beam differs by about 10 dB.

PB80-134554 PC **A07**/MF **A01**
Illinois Univ. at Urbana Champaign. Dept. of Civil Engineering.
LASS-III, Computer Program for Seismic Response and Liquefaction of Layered Ground Under Multi-Directional Shaking,
Jamshid Ghaboussi, and S. Umit Dikmen. Jul 79, 146p UILU-ENG-79-2012, NSF/RA-790271
Grant NSF-ENV76-00626

A new method of analysis is described for evaluation of seismic response and liquefaction of horizontally layered ground subjected to three components of earthquake base acceleration. Heretofore, only one component--the horizontal one with highest peak accleration--was chosen for analysis. However, it is generally agreed that the potential for liquefaction under the simultaneous action of both horizontal earthquake components is often higher than the liquefaction potential under the strongest horizontal component of earthquake base acceleration. Accordingly, saturated sand below the water table was modeled as a two-phase medium, with the porous granular solid and pore water as constituent materials. A new material model was introduced for the behavior of sand under cyclic bi-axial shear stresses. Results of analyses indicate the following: (1) the vertical component of base acceleration has minimal influence on the development and pattern of liquefaction, (2) interaction between the two horizontal components of shaking significantly influences the development and pattern of liquefaction, (3) increasing the amplitude of base acceleration in a one-directional analysis does not completely reproduce the major effects present in a two-dimensional analysis, and (4) interaction between the two horizontal components of shaking produces surface response spectra somewhat different from that of one-dimensional analysis.

PB80-140569 PC **A04**/MF **A01**
South Dakota State Univ., Brookings. Water Resources Research Inst.
Model Development for Predicting Soil Moisture by Thermography.
Completion rept.,
Jerald A. Tunheim. Jan 80, 64p W80-03007, OWRT-A-063-SDAK(1)
Contract DI-14-34-0001-7088

Experimental and theoretical investigations were carried out relating to the detection and mapping of soil moisture by the use of remote sensed thermal emittance data (thermography). Soil temperature profiles, thermal emittance, soil moisture and other pertinent data were collected for test plots under fallow and crop cover conditions. Data were always collected simultaneously for two plots with identical surface conditions but one of the plots irrigated to create different soil moisture profiles. Calculations of surface temperature difference as a function of time for these soil moisture conditions were made utilizing a theoretical model. The functional form of the theoretical temperature difference with time were shown to be very close to the experimental apparent temperature difference for both crop cover and bare soil conditions. The general nature of additional parameters needed for the present model are also described.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A079 597/1 PC **A05**/MF **A01**
Harvard Univ Cambridge MA Gordon Mckay Lab
Currents and Charges on Cylinders in a Parallel-Plate Transmission Line.
Final rept. 30 Jun 76-30 Jun 79,
T. T. Wu, M. Krook, R. W. P. King, D. J. Blejer, and T. K. Sarkar. Jul 79, 84p AFOSR-TR-80-0005
Grant AFOSR-76-3073

The final report summarizes the results of a 3-year model study to evaluate how well a parallel-plate transmission-line structure simulates an electromagnetic pulse with a plane-wave front. The amplitude and phase of the electric field inside the model simulator have been measured at two high frequencies for which transmission-line theory does not apply. An approximate theoretical representation of the field is used to interpret the measured data. Differences between the actual field and the desired traveling plane-wave field are discussed, and possible methods to improve the field in the simulator are offered. (Author)

AD-A079 623/5 PC **A13**/MF **A01**
Analysis and Computer Systems Inc Burlington MA
Development of Numerical Techniques and Computer Systems for Design, Analysis and Fabrication of Interdigital Transducers as Surface Acoustic Wave Devices.
Final technical rept. 24 May 76-31 Mar 78,
Lawrence J. Elterman. Aug 79, 299p RADC-TR-79-181
Contracts F19628-76-C-0257, F19628-78-C-0028

Computerized, mathematical and analytical techniques were developed, refined and applied to the description, analysis and synthesis of surface acoustic wave (SAW) transduction structures and devices. Efficient mapping techniques between the various description mathematical models and techniques in support of electron beam fabrication of SAW interdigital transducers were developed and refined. A number of computer programs were completed ranging in complexity and size from modifications to existing programs, to design and development of complex analytical techniques utilizing numerical control methodology. (Author)

AD-A079 649/0 PC **A02**/MF **A01**
National Bureau of Standards Washington DC National Measurement Lab
Piezoelectric and Pyroelectric Applications of Plastics.
Technical rept.,
M. G. Broadhurst, S. Edelman, and G. T. Davis. Jan 80, 11p Rept no. TR-14
Contract N00014-79-F-0012
Presented at the Symposium on New Applications for Plastics, Houston, TX. 23-28 Mar 80.

This paper summarizes the advantages and disadvantages of polymer piezoelectric and pyroelectric transducers relative to transducers made of ceramic materials. It is concluded that polymers are the material of choice for some special measurement problems and inferior for others. A large list of applications ranging from commercial to exploratory is given with references to further information. (Author)

AD-A079 812/4 PC **A05**/MF **A01**
Westinghouse Research and Development Center Pittsburgh PA
Indium Phosphide for High Frequency Power Transistors.
Annual technical rept. 21 Feb 78-21 Mar 79,
V. L. Wrick, G. W. Eldridge, R. C. Clarke, and M. C. Driver . 25 Sep 79, 95p Rept no. 243-023-T1
Contract N00014-78-C-0254, DARPA Order-3535

This report covers the first year of studies aimed at determining the utility of InP for fabricating power microwave field effect transistors (FET). The initial phase of the work was concentrated on developing the technology necessary to complete a power FET based on current design philosophy. Ion implantation and vapor phase epitaxy (VPE) results are presented as a means for providing an active channel for the device. Further work is planned for VPE channels because of the potential benefits of buffer layers under development. Processing technology (etching, ohmic contacts) is reviewed. In addition, a review of gate technology is provided since this is the largest technology issue for the InP FET. The results of the gate studies has been a concentration of effort on developing a JFET during the conclusion of the program. (Author)

AD-A080 031/8 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY
Research on Microwave Junction Gate Field Effect Transistors.
Final rept. 1 Jun 76-31 May 79,
S. K. Ghandhi. 19 Dec 79, 15p ARO-13586.5-EL
Grant DAAG29-76-G-0172

This program has considered basic problems in the fabrication of junction-gate FET devices. We have shown that Ga(x)In(1-x)As layers can be grown of the appropriate composition (x = 0.468 + or - 3%) required to obtain a good lattice match to indium phosphide substrates. Additionally, techniques have been developed for in-situ etch of substrates prior to epitaxial growth. Diffusion and masking techniques have been developed for making junctions with no enhanced lateral diffusion. These diffusions are carried out in the absence of an arsenic overpressure, and are limited to n-type layers at the present time. (Author)

AD-A080 044/1 PC **A05**/MF **A01**
Mpb Technologies Inc Ste-Anne-de-Bellevue (Quebec)
Study of Noise in Crossed-Field Devices.
Final technical rept. 15 Apr 77-30 Sep 79,
Issie P. Shkarofsky, and Ian P. W. Sinclair. 30 Nov 79, 82p MPB-112-2, AFOSR-TR-80-0032
Contract F49620-77-C-0106

This research effort addresses the fundamentals of noise in electron beams in crossed field microwave tubes. Recent evolvement of new applications for DOD requires tubes with better noise characteristics in addition to the higher bandwidth and gain characteristics of crossed field devices. Much work was expended in this type of research up to 1969 but thereafter concepts have remained neglected and unexplored until 1977 when efforts were renewed. The approach here is to re-examine the analyses using simple models, to resolve various unknowns and gaps in knowledge and to investigate original unexplored avenues with which we can gain more insight into the mechanisms of fluctuation and modulation in electron beams travelling in crossed electric and magnetic fields. In the first year's effort, expressions were derived based on kinetic theory for the seven moments over the energy distribution function in a plasma thermionic diode with crossed electric and magnetic fields, both for the space-charge limited and magnetic-field limited situations. The expressions are given as integrals over the distribution function at the cathode surface, whose form is left arbitrary. Analytic results, valid in the region of the potential minimum, are provided in the space-charge limit when the potential profile is assumed to be parabolic in the vicinity of its minimum. The seven moments are the density profile, the two current flux components, the two mean velocity components and the two mean square velocity components.

AD-A080 076/3 PC **A03**/MF **A01**
Hughes Aircraft Co Torrance CA Electron Dynamics Div
3.2 Millimeter Wave Transmitter Tube.
Interim rept. 1 Oct 78-30 Jan 79,
Ken Arnold. Jan 80, 30p DELET-TR-78-3015-1
Contract DAAB07-78-C-3015

Design trade-offs have been performed for 95 GHz coupled-cavity traveling wave tubes for two pulse power levels, 100 watts and 1000 watts, respectively. Results indicate that average power levels of 50 watts are feasible in the 100 watt peak power case and that 10 watt average power levels are feasible in the 1000 watt peak power case. (Author)

AD-B011 702/8 PC **A09**/MF **A01**
Northrop Research and Technology Center Hawthorne Calif
Study of Radiation Effects in Bulk CMOS Microcircuits, I2L/LSI Logic Cells and Optical Couplers.
Final rept. Jan-Dec 74,
James P. Raymond, T. Y. Wong , J. E. Ashe, and C. W. Perkins. Jun 75, 196p NRTC-75-32-R, DNA-3776F
Contract DNA001-73-C-0154
Distribution limitation now removed.

Results are presented on the study of radiation effects in bulk CMOS microcircuits, basic logic cells of developmental integrated-injection-logic (I2L) LSI, and optical couplers. Radiation effects consid-

ered include the permanent damage effects resulting from neutron displacement damage and total ionizing radiation dose. Transient photoresponse has been measured as a function of ionizing radiation pulse width. CMOS latch-up was investigated as induced by electrical pulsed overstress and/or pulsed ionizing radiation exposure. No significant synergistic effects were observed. (Author)

AD-B015 892/3 PC **A03**/MF **A01**
General Electric CO Philadelphia PA Space Div
Vidicon Modification Study.
Final rept. Jan-Jul 76,
Robert J. Boram. Jul 76, 26p AFATL-TR-76-92
Contract F08635-76-C-0167
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

Electronic processing was performed on the video output from a standard vidicon camera using sample and hold modules and integrators. The objective of the equipment development was to square up the apparent MTF of the vidicon to compare with that of a CCD imaging device under conditions of low scene contrast. Improvement in resolution of low contrast targets was noted, but was less than expected (2:1). (Author)

AD-B019 126/2 PC **A06**/MF **A01**
Iit Research Inst Chicago Ill
Bi-Directional Multi-Station Command/Information Bus.
Final rept. Apr 75-May 76,
Allan R. Kaurs, James E. Kietzer, and Narayan P. Murarka. Nov 76, 122p IITRI-FR-E6328, AFFDL-TR-76-122
Contract F33615-75-C-3100
Distribution limitation now removed.

The suitability of dielectric waveguide as a transmission medium in data bus applications has been presented in this report. The feasibility of the concepts has been demonstrated through a Model 400 Dielectric Waveguide Data Bus System. The system operates at millimeter-wave frequencies (22 to 30 GHz) and has two frequency division multiplexed (FDM) data channels, each of which can carry data at rates of up to about 10 Mb/s. The system demonstrates multi-channel bi-directional data transfer capabilities over a 100 ft dielectric cable. In this report the design features and test results of a tunable bandpass ring coupler are also presented. These couplers are used in the Model 400 System for coupling signals to and from the data bus. In addition to hardware demonstration of dielectric waveguide systems, their concepts have been used to obtain a data bus configuration for a specific aircraft. For this purpose, flight control signals of the YF-16 aircraft were chosen as an illustration. The data bus configuration for this aircraft has been presented in a block diagram form. It shows that the dielectric waveguide system can fully accommodate all the signal flow requirements. (Author)

AD-B019 895/2 PC **A03**/MF **A01**
Denver Research Inst Colo
Vulnerability of Wires and Cables.
Technical publication,
Thomas W. Ipson, Rodney F. Recht, and William A. Schmeling. Jun 77, 26p NWC-TP-5966
Contract N00123-76-C-0166, N00123-72-C-0267
Distribution limitation now removed.

The objective of this research project was to produce experimentally verified models capable of predicting the vulnerabilities of single wires, coaxial cables, and multiconductor cables as functions of the weights and velocities of ballistic fragments and of attack aspect. An experimental firing program was conducted against solid conductor and stranded conductor wires, coaxial cable, and a large multiconductor cable. Equations were developed which predict the breaking velocity, in terms of fragment weight, of single conductor wires and cables. Equations for defining the vulnerable areas of such wires and cables are presented. Models and procedures, which are based upon the use of the single conductor equations, were developed to provide a definition of the kill probabilities of multiconductor cables. The uses of these models and procedures are illustrated by means of examples. (Author)

PAT-APPL-6-056 769 PC **A02**/MF **A01**
Department of the Navy Washington DC
MHD Pinch Interrupting Switch for High Currents.
Patent Application,
Owen S. Taylor. Filed 2 Jul 79, 13p AD-D006 810/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Switching apparatus for very high currents utilizes the magneto hydrodynamic pinch effect to interrupt a liquid metal column that occupies the gap between a pair of spaced conductors maintained apart by an insulating sleeve. The on/off condition of the switching apparatus is controlled by regulating the relationship between the fluid pressure within the sleeve and P sub p, the MHD pinch pressure. (Author)

PAT-APPL-6-082 383 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Improved Discriminating Circuit Breaker Protection System for Direct Current Power Distribution Systems.
Patent Application,
Derek A. Paice, and Alan B. Shimp. Filed 5 Oct 79, 18p PB80-139447
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates in general to protection of direct current power distribution systems and in particular to electronic discriminating circuit breaker protection systems for mine power distribution systems. The discriminating circuit breaker system for direct current power distribution comprises an electrically controlled circuit breaker connected between each power supply and the associated transmission line comprising a DC power distribution system, and a control circuit for controlling the operation of the circuit breakers.

PATENT-4 174 966 Not available NTIS
Department of the Interior, Washington, DC.
High Coercive Force Rare Earth Metal-Cobalt Magnets Containing Copper and Magnesium.
Patent,
John W. Walkiewicz. Filed 15 Dec 78, patented 20 Nov 79, 4p PB80-139165, PAT-APPL-969 767
Supersedes PB-292 212.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates to rare earth-cobalt permanent magnets which do not contain samarium as an essential component. A magnetic alloy composition contains: 34 to 37 wt.% RE 55.6 to 63.9 wt.% Co 2 to 7 wt.% Cu .05 to .40 wt.% Mg, wherein RE is mischmetal or a rare earth metal excluding samarium.

PATENT-4 176 899 Not available NTIS
Department of the Navy Washington DC
Quick Disconnect Electrical Connector Having Disassembly Features for Refurbishment.
Patent,
Edward E. Betts. Filed 23 Oct 78, patented 4 Dec 79, 7p AD-D006 872/6, PAT-APPL-953 509
Supersedes PAT-APPL-953 509-78, AD-D006 661.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is an improvement to the female portion of a quick disconnect electrical connector so that said portion can be easily disassembled for refurbishment. The female portion of the quick disconnect is of the type having concentric sleeves which are slidable with respect to one another. The forward ends of the sleeves are adapted to receive a male portion of the mating electrical connector, and the rearward end of one of the sleeves in connected to an elongated element, such as an electrical cable. An annular space is provided at the rearward end portions of an inner and outer adjacent pair of the sleeves, and a compression spring within the annular space is utilized for urging the adjacent sleeves longitudinally apart with respect to one another. The improvement includes a device located within a rear portion of the annular space and releasably connected to the inner adjacent sleeve for stopping rearward movement of the compression spring. With this arrangement the outer sleeve can be slid forwardly and removed entirely from the inner sleeve after release and removal of the stop devices.

PATENT-4 179 533 Not available NTIS
Department of the Navy Washington DC
Multi-Refractory Films for Gallium Arsenide Devices.
Patent,
Aristos Christou, and Howard M. Day. Filed 25 Apr 78, patented 18 Dec 79, 7p AD-D006 877/5, PAT-APPL-899 935
Supersedes PAT-APPL-899 935-78, AD-D004 976.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a method for constructing systems of refractory layers for use in making gallium arsenide (GaAs) semiconductor devices, having gold as the conducting electrode, which devices are thermally stable when thermally stressed up to about 600 C. for approximately 24 hours. The method forms refractory layers of either tantalum-platinum-tantalum, or tungsten-platinum-tungsten, or titanium tungsten-platinum to develop both the Schottky barrier to GaAs and the diffusion barrier between gold and GaAs. Each of the refractories are individually deposited, at specific temperatures in the range of 50 C. to 175 C., on a GaAs wafer within a vacuum. The metalized wafer cools to room temperature and is removed from the vacuum. Contacts are then typically defined on the wafer and the wafer is subsequently bonded.

PATENT-4 179 583 Not available NTIS
Department of the Navy Washington DC
Electro-Mechanical Low Backlash Cable Connector.
Patent,
Sergius S. Sergev. Filed 6 Mar 78, patented 18 Dec 79, 7p AD-D006 878/3, PAT-APPL-883 557
Supersedes PAT-APPL-883 557-78, AD-D004 968.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes an electro-mechanical, low backlash cable connector having a plurality of spring washers disposed within a connector housing. A plurality of spacer washers disposed between each pair of spring washers imparts independent operation to each spring washers and translates shear forces from the entering cable to the connector housing. Both the spring washers and the spacer washers are disposed at an inward angle from the connector housing opening. Such angular disposition allows a cable to freely enter the connector housing. However, upon attempting to withdraw the cable, the spring washers bite into the cable thereby preventing its egress. (Author)

PATENT-4 184 896 Not available NTIS
Department of the Air Force Washington DC
Surface Barrier Tailoring of Semiconductor Devices Utilizing Scanning Electron Microscope Produced Ionizing Radiation.
Patent,
Michael F. Millea. Filed 6 Jun 78, patented 22 Jan 80, 5p AD-D006 851/0, PAT-APPL-913 186
Supersedes PAT-APPL-913 186-78, AD-D005 129.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method of spatially tailoring the surface barrier of MOS devices by means of a scanning electron microscope using ionizing radiation at the silicon dioxide-silicon interface to control the surface charge distribution. The MOS is subsequently annealed at about 300 C. for several hours to stabilize the surface potential. (Author)

PATENT-4 185 292 Not available NTIS
Department of the Air Force Washington DC

Potential Troughs for Charge Transfer Devices.
Patent,
Richard D. Nelson. Filed 3 Aug 78, patented 22 Jan 80, 4p AD-D006 846/0, PAT-APPL-930 788
Supersedes PAT-APPL-930 788-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a surface channel charge transfer device noise due to the presence of surface states is minimized by ion implanting the charge coupled device propagation channel so as to provide a narrow potential trough which confines the charge to the center of the CCD channel. (Author)

PB80-131063 Not available NTIS
National Bureau of Standards, Washington, DC.
Losses in Electrode Surface Films in Gas Dielectric Capacitors.
Final rept.,
E. So, and J. Q. Shields. Dec 79, 6p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Instrumentation and Measurement 28, n4, p279-284, Dec 79.

The surface characteristic of a number of electrode materials including stainless steel, brass, brass with various plated surfaces, aluminum, and anodized aluminum has been examined over a wide range of humidity. The measurements of surface characteristic, expressed in microradian millimeters, have an estimated uncertainty of 0.01 microrad(mm).

PB80-134596 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC.
Measurements on Insulating Materials at Cryogenic Temperatures.
Final rept.,
William E. Anderson, and Richard S. Davis. Aug 79, 165p NBSIR-79-1950
Contract DOE-EA-77-A-01-6010
See also CONS-2062-1.

The report describes the results of a four-year effort to study the high voltage dielectric behavior of various materials at cryogenic temperatures. Dissipation factors at 60 Hz were measured for polymer tapes and epoxy samples at 4.2 K, atmospheric pressure. Multi-layer polymer samples in coaxial geometries at temperatures from 7 to 10 K and helium pressures up to 1.5 megapascals were also studied. The measurements were performed at stresses up to 40 MV/m. Since partial discharges were a major source of losses at the higher stresses and their presence was possibly detrimental to the integrity of the insulation, instrumentation was developed and implemented to study these discharges under conditions found in proposed ac superconducting power-transmission lines.

PB80-144645 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Zinc Oxide Varistors for Lightning Arrester Service.
Final rept. Oct 78-Sep 79,
Robert I. Scace. Dec 79, 25p NBSIR-79-1939
Sponsored in part by Department of Energy, Washington, DC. Div. of Electric Energy Systems.

The application of zinc oxide (ZnO) varistors to high-power surge arresters for electrical transmission lines is considered, with particular attention to the special measurement problems posed by the application and by the unique properties of these varistors. The development of ZnO varistors and the present theory of ZnO varistor action are discussed. Consideration is given to the need for further elaboration of the theory.

PB80-805997 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electron Beam Semiconductor Devices (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
William E. Reed. Mar 80, 79p
Supersedes NTIS/PS-79/0142, NTIS/PS-78/0174, and NTIS/PS-77/0158. For the companion Published Search of the Engineering Index Data Base, see PB80-806003.
Federally-sponsored research reports are cited, covering the design, development, fabrication, and applications of electron beam semiconductor devices. Applications include amplifiers, pulse generators, image tubes, switches, and electron beam memory devices. (This updated bibliography contains 72 abstracts, 5 of which are new entries to the previous edition.)

PB80-806003 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electron Beam Semiconductor Devices (Citations from the Engineering Index Data Base).
Rept. for 1970-Feb 80,
William E. Reed. Mar 80, 97p
Supersedes NTIS/PS-79/0145, NTIS/PS-78/0175, and NTIS/PS-77/0159. For the companion Published Search of the NTIS Data Base, see PB80-805997.

The bibliography cites worldwide research on the design, development, fabrication, performance, and applications of electron beam semiconductor devices. Applications include amplifiers, image tubes, memory devices, pulse generators, and electron beam pumped semiconductor lasers. (This updated bibliography contains 90 abstracts, 9 of which are new entries to the previous edition.)

9B. Computers

AD-A079 627/6 PC **A11**/MF **A01**
Mcdonnell Douglas Astronautics Co St Louis MO
Reliability Evaluation and Electrical Characterization of Memories.
Final technical rept. Nov 76-Oct 78,
A. T. Sasaki. Sep 79, 226p RADC-TR-79-193
Contract F30602-77-C-0003

LSI memories implemented with five different semiconductor technologies were electrically characterized as a function of temperature, voltage and pattern sensitivity. No new technology related characteristics were revealed that would limit the performance characteristics of these memories. The CMOS/SOS memory was the only device to exhibit a pattern sensitivity, but this is not believed to be related to the CMOS/SOS technology. Only the two static memory types (NMOS and CMOS) exhibited the capability for full military temperature range operation, and the 85 C performance of the CMOS/SOS memory was severely degraded (although still useful) at 125 C. Studies of pattern effectiveness suggested that N type patterns could be used for electrical characterization. Except where N-square pattern sensitivities are present, as was the case with the CMOS/SOS RAM, little difference was observed between the N-squared and N functional test results. Pattern related timing variations were also negligible. Although efforts were made to identify N or N-to-the-three-halves-power type patterns that would detect all types of defects, an N-squared pattern sensitivity was detected in the CMOS/SOS RAM. Without specific knowledge of the nature of the CMOS/SOS RAM deficiency, it is apparent that n-squared tests are necessary to detect these types of RAM deficiencies. It is recommended that future electrical characterization studies include provisions for determining the nature of observed device deficiencies.

AD-A079 673/0 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Programming System for an Inaccessible PDP-11.
Summary rept.,
John C. Nickles, and William B. Fincke. 1979, 12p Rept no. MPL-U-90/78
Contract N00014-76-C-0108
Pub. in Proceedings of the Digital Equipment Computer Users Society, p1227-1230 Apr 79.

No abstract available.

AD-A079 709/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
MOD--A Language for Distributed Programming.
Technical summary rept.,
Robert P. Cook. Oct 79, 31p Rept no. MRC-TSR-2008
Contract DAAG29-75-C-0024

Distributed programming is characterized by high communications costs and the absence of shared variables and procedures as synchronization tools. MOD is a high-level language system which attempts to address these problems by creating an environment conductive to efficient and reliable network software construction. The concept of a processor module is introduced as well as a methodology for distributed data abstraction and process communication. In addition, a VHLN (virtual high-level language network) is proposed for system development. (Author)

AD-A079 716/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
An Adaptive Nonlinear Least-Squares Algorithm.
Technical summary rept.,
John E. Dennis, David M. Gay, and Roy E. Welsch. Oct 79, 45p Rept no. MRC-TSR-2010
Contract DAAG29-75-C-0024, Grant NSF-MCS76-00324
Sponsored in part by Grants NSF-DCR75-10143, NSF-MCS78-09525.

NL2SOL is a modular program for solving nonlinear least-squares problems that incorporates a number of novel features. It maintains a secant approximation S to the second-order part of the least-squares Hessian and adaptively decides when to use this approximation. S is 'sized' before updating, something which is similar to Oren-Luenberger scaling. The step choice algorithm is based on minimizing a local quadratic model of the sum of squares function constrained to an elliptical trust region centered at the current approximate minimizer. This is accomplished using ideas discussed by More, together with a special module for assessing the quality of the step thus computed. These and other ideas behind NL2SOL are discussed and its evolution and current implementation are also described briefly. (Author)

AD-A079 785/2 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Data Processing by Means of Functional Optrons.
K. F. Bierkowskaja, J. P. Biernsztejn, G. K. Grigorjew, S. B. Guerwicz, and B. G. Podlaskin.
27 Aug 79, 28p Rept no. FTD-ID(RS)T-1065-79
Edited trans. of Elektronika (Poland) n5 p199-203 1978.

No abstract available.

AD-A079 897/5 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Functional Requirements of a Target Description System for Vulnerability Analysis.
Memorandum rept.,
Earl P. Weaver. Nov 79, 28p ARBRL-MR-02972, AD-E430 348

This paper defines the functional requirements of a target description (geometric modeling) system for vulnerability analysis. Included are discussions of one philosophy of a new target description system in the context of present computer technology and the intended use of the target description system, required outputs, and new methods of generating and modifying target descriptions. (Author)

AD-A079 987/4 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Parallel Operations on Binary Images.
Interim rept.,
Reinhard Klette. Nov 79, 33p TR-822, AFOSR-TR-80-0078
Grant AFOSR-77-3271

It is a well-known fact that parallel logical operations and shifts are useful for speeding up certain computational tasks in binary image processing. A theoretical model for computation is given using these operations as basic instructions. Some examples demonstrate the utility of such a parallel processing system for fast solutions, e.g., the recognition of rectangles, squares, and isosceles right triangles can be done within time 0(log N), for input images of size triangles can be done within time 0(log N), for input images of size NxN. (Author)

AD-A079 988/2 PC **A02**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Region Property Computation by Active Quadtree Networks.
Interim rept.,
Tsvi Dubitzki, Angela Y. Wu, and Azriel Rosenfeld. Nov 79, 25p TR-823, AFOSR-TR-80-0091
Grant AFOSR-77-3271

Given a binary image stored in a cellular array, a local reconfiguration process can be used to reconnect some of the cells into a quadtree network representing the image. This quadtree can also be roped, i.e., nodes representing adjacent image blocks of the same size can be joined. Using the roped quadtree network, image properties such as perimeter and genus, as well as the quadtree distance transform, can be computed in 0(tree height)=0(log image diameter) time, as can the area and centroid even without roping. (Author)

AD-B011 713/5 PC **A04**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
DOD Weapon Systems Software Management Study. Appendix E. Bibliography.
Special rept.,
E. J. Blau, H. M. Stainer, and C. L. Williamson. Jun 75, 66p Rept no. APL/JHU-SR-75-3E
Contract N00017-72-C-4401
Appendix E to report dated Jun 75, AD-A022 160. Distribution limitation now removed.

This appendix to the DoD Weapon Systems Software Management Study conducted by APL contains a bibliography of the relevant documents acquired and used throughout the course of the study and a brief discussion of an associated Software Library. The Library was established to support the study effort by providing easy access to necessary background material. The acquisition, processing, and circulation of the library documents are discussed along with the various computerized retrieval tools used to provide information about the documents. (Author)

AD-B032 285/9 PC **A10**/MF **A01**
Command and Control Technical Center Washington D C
H6000 Tuning Guide. Volume IV - Appendixes. Revision 1.
Technical memo.,
Barry M. Wallack, and George H. Gero, Jr. 1 Sep 78, 211p CCTC-TM-180-78-VOL-4-REV-1, SBIE-AD-E100119
Revision 1 to Rept. no. CCTC-TM-180-78, AD-A060 873.
Distribution limitation now removed.

The Federal Computer Performance Evaluation and Simulation Center (FEDSIM) has developed a document for WWMCCS installations that can be used by site personnel to analyze the performance characteristics of their Honeywell 6000 (H-6000) computer systems. This document, called an H-6000 Tuning Guide, incorporates detailed analysis procedures that guide the analyst in applying specific techniques to improve system performance. The four volumes of this Tuning Guide presents a precisely structured system of procedures for the analysis of the performance of WWMCCS computer services and systems: The first volume describes the overall structure and application of the Tuning Guide. It explains the approach, procedures, and processes taken by the Tuning Guide to provide analyses of batch job turnaround time and GCOS Time Sharing System (TSS) response time. This fourth volume provides the appendixes referenced by the other volumes of the Tuning Guide. The volume contains detailed descriptions of report formats and other references data.

AD-B032 373/3 PC **A04**/MF **A01**
Command and Control Technical Center Washington D C
H-6000 Tuning Guide WWMCCS System Tuning Process. Volume I. Revision I.
Technical memo.,
Barry M. Wallack, and George H. Gero, Jr. 1 Sep 78, 57p CCTC-TM-180-78-VOL-1-REV-1, SBIE-AD-E100122
Revision 1 to Rept. no. CCTC-TM-180-78-VOL-1 dated 3 Feb 78, AD-A059 937.
Distribution limitation now removed.

The Federal Computer Performance Evaluation and Simulation Center (FEDSIM) has developed a document for WWMCCS installations that can be used by site personnel to analyze the performance characteristics of their Honeywell 6000 (H-6000) computer systems. This document, called an H-6000 Tuning Guide, incorporates detailed analysis procedures that guide the analyst in applying specific techniques to improve system performance. The four volumes of the Tuning Guide present a precisely structured system of procedures for the analysis of the performance of WWMCCS computer services and systems. The first volume describes the overall structure and application of the Tuning Guide. It explains the approach, procedures, and processes taken by the Tuning Guide to provide analyses of batch job turnaround time and GCOS Time Sharing System (TSS) response time.

N80-16405/6 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Wallops Station, Wallops Island, VA.
Synthetic Aperture Radar/Landsat MSS Image Registration.
H. E. Maurer, J. D. Oberholtzer, and P. E. Anuta. Jun 79, 225p NASA-RP-1039
Contracts NAS6-2816, NAS6-2827
Subm-Sponsored in Part by Goodyear Aerospace Corp. Misc-Original Contains Color Illustrations.

Algorithms and procedures necessary to merge aircraft synthetic aperture radar (SAR) and LANDSAT multispectral scanner (MSS) imagery were determined. The design of a SAR/LANDSAT data merging system was developed. Aircraft SAR images were registered to the corresponding LANDSAT MSS scenes and were the subject of experimental investigations. Results indicate that the registration of SAR imagery with LANDSAT MSS imagery is feasible from a technical viewpoint, and useful from an information-content viewpoint.

N80-16742/2 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
INFORM: An Interactive Data Collection and Display Program with Debugging Capability.
D. S. Cwynar. Jan 80, 169p NASA-TP-1424, E-9810

A computer program was developed to aid ASSEMBLY language programmers of mini and micro computers in solving the man machine communications problems that exist when scaled integers are involved. In addition to producing displays of quasi-steady state values, INFORM provides an interactive mode for debugging programs, making program patches, and modifying the displays. Auxiliary routines SAMPLE and DATAO add dynamic data acquisition and high speed dynamic display capability to the program. Programming information and flow charts to aid in implementing INFORM on various machines together with descriptions of all supportive software are provided. Program modifications to satisfy the individual user's needs are considered.

N80-16743/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Linking of the Mini-Computer Electronik-100I and NR-9821A.
B. V. Zubkov, and V. N. Khromov. Nov 79, 35p NASA-TM-75670, PR-312
Contract NASW-3199
Tran-Transl. Into English of "Soprazheniye Mini-Evm Electronika 100I I Nr-9821A", Rept. Pr-312 Acad. Of Sci. (USSR), Inst. Of Space Res., Moscow, 1976 p 1-33. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The means of transmitting digital information from the computer E-100I to the desk top calculator NR-9821A with the help of an intermediate carrier of information (perforated tape) is described. The means of removal of information from the computer E-100I in a form which is understandable for the NR-9821A are given. Instructions for the use and programming of the transcription of information onto magnetic tape from the perforated tape and from the keyboard of the calculator are included.

N80-16766/1 PC **A05**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VICAR Image Processing System Guide to System Use.
J. B. Seidman, and A. Y. Smith. 1 Dec 79, 77p NASA-CR-162693, JPL-PUB-77-37-REV-1
Contract NAS7-100
Misc-Revised.

The functional characteristics and operating requirements of the Video Image Communication and Retrieval System are detailed.

N80-16767/9 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Computing Region Moments from Boundary Representations.
J. M. Wilf, and R. T. Cunningham. 1 Nov 79, 36p NASA-CR-162685, JPL-PUB-79-49
Contract NAS7-100

The class of all possible formulas for computing arbitrary moments of a region from the region's boundary is derived. The selection of a particular formula depends on the choice of an independent parameter. Several choices of this parameter are explored for region boundaries approximated by polygons. The parameter choice that minimizes computation time for boundaries represented by chain code is derived. Algorithms are presented for computing arbitrary moments for a region from a polygonal approximation of its boundary and for computing low order moments from chain encoded boundaries.

N80-16768/7 PC **A02**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Symbolic-Numeric Interface: A Review.
E. W. Ng. 1 Jan 80, 21p NASA-CR-162690, JPL-PUB-79-106
Contract NAS7-100

A survey of the use of a combination of symbolic and numerical calculations is presented. Symbolic calculations primarily refer to the computer processing of procedures from classical algebra, analysis, and calculus. Numerical calculations refer to both numerical mathematics research and scientific computation. This survey is intended to point out a large number of problem areas where a cooperation of symbolic and numerical methods is likely to bear many fruits. These areas include such classical operations as differentiation and integration, such diverse activities as function approximations and qualitative analysis, and such contemporary topics as finite element calculations and computation complexity. It is contended that other less obvious topics such as the fast Fourier transform, linear algebra, nonlinear analysis and error analysis would also benefit from a synergistic approach.

PATENT-4 130 887 Not available NTIS
Department of the Navy Washington DC
Digital Plotting System for Displaying Character Information.
Patent,
Edward R. Reins, and Charles D. B. Curry. Filed 14 Nov 77, patented 19 Dec 78, 29p AD-D006 853/6, PAT-APPL-851 086
Supersedes PAT-APPL-851 086-77, AD-D004 779.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A digital plotting system for displaying character informaton. The character information includes symbols and alphanumeric information and an individual or group of characters may be presented in sequence from any point on a graph. The logic system describes each symbol within its own preselected retangular coordinate grid system from bottom to top and alternately from left to right and from right to left. At the end of each character definition the logic automatically returns the registers to the starting position for the next character. The character logic is compatible for use with a digital plotting system for displaying all forms of graphic information including curved lines, straight lines and characters. (Author)

PATENT-4 149 164 Not available NTIS
Department of the Navy Washington DC

Digital Plotting System for Graphic Information.
Patent,
Edward R. Reins, and Robert W. Herman. Filed 27 Dec 77, patented 10 Apr 79, 30p AD-D006 855/1, PAT-APPL-864 286
Supersedes PAT-APPL-864 286-77, AD-D004 784.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a digital plotting system that receives and stores coded signals depicting graphic information for processing and display. The system processes three basic types of information which are short vector information, long vector information and character information. Together these three types of information can reproduce virtually any type of graphic information that is desired to be transmitted and displayed. The short vector information describes curved lines, the long vector information describes straight lines and the character information describes alphanumerics and symbols. The system employs effective data compaction techniques resulting in a substantial reduction of processed data as compared to facsimile processing. The system automatically stores and provides for sequential selection of the short vector, long vector and alphanumeric information for presentation.

PATENT-4 149 165 Not available NTIS
Department of the Navy Washington DC
Digital Plotting System for Displaying Curved Line Information.
Patent,
Robert W. Herman, and Edward R. Reins. Filed 27 Dec 77, patented 10 Apr 79, 25p AD-D006 856/9, PAT-APPL-865 076
Supersedes PAT-APPL-865 076-77, AD-D004 785.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A digital plotting system for displaying curved line information. This system employs short vector information that provides an incremental trace of a curve that is defined by a variable exception vector that is dependent upon trend and exception vectors represented by ODD and EVEN bits described as binary 1's or 0's. When the bit is a binary 0, for example, the vector, whether ODD or EVEN, will continue in the same direction as the immediately preceding vector. However, when the bit is a binary 1 then the vector will change its direction clockwise 45 deg. when EVEN and counterclockwise 45 deg. when ODD, with respect to the immediately preceding vector. The short vector logic is compatible for use with a digital plotting system for displaying all forms of graphic information including curved lines, straight lines and characters. (Author)

PATENT-4 163 286 Not available NTIS
Department of the Navy Washington DC
Digital Plotting System for Displaying Straight Line Information.
Patent,
Edward R. Reins, and Charles D. B. Curry. Filed 14 Nov 77, patented 31 Jul 79, 30p AD-D006 859/3, PAT-APPL-851 022
Supersedes PAT-APPL-851 022-77, AD-D004 778.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, Dc 20231 $0.50.

A digital plotting system for displaying straight line information. This system employs a long vector to describe a long straight line on a graph that starts from any point, extends in any direction and has a specific length. The direction is implemented by an eight 45 deg. quadrant system wherein the specfic angle within a particular quadrant is derived from binary slope storage and rate generator devices and is referenced from either a vertical adjacent line or a horizontal adjacent line. The long vector logic is compatible for use with a digital plotting system for displaying all forms of graphic information including curved lines, straight lines and characters. (Author)

PATENT-4 186 440 Not available NTIS
Department of the Navy Washington DC
Continuous Memory System.
Patent,
Leo C. Miller, James A. Perschy, and Gordon D. Smith, Jr. Filed 24 May 66, patented 29 Jan 80, 7p AD-D006 881/7, PAT-APPL-552 639
Supersedes PAT-APPL-552 639-66.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates to a system for the reception, storage and subsequent transmission of information. The system utilizes a main memory and an auxiliary memory. The information received by the auxiliary memory updates and corrects the information in the main memory. A timing generator controls the timing of the memory scan periods and a time normalizer is utilized to correct frequency deviations of the timing generator. A detector monitors the operation of the system. (Author)

PB80-110232 PC**$40.00**/MF**$40.00**
National Technical Information Service, Springfield, VA.
The 1980 Directory of Computer Software and Related Technical Reports.
Jan 80, 316p
Updates NTIS-SR-78-03.

The 1980 Directory of Computer Software and Related Technical Reports is a unique guide to federal machine-readable software and carefully selected technical reports--all directly relating to the software packages. The information in the Directory was compiled in cooperation with more than 100 agencies in the U.S. Government. More than 350 programs are listed and described in 27 subject categories in the areas of social sciences, economics, science, and technology. Included in the Directory is computer software in the following areas: Modeling & Simulation; Statistical Analyses & Evaluation; Operating Systems; Control Systems; Data Base Management Systems; Search/Retrieval Systems; Application Programs. The computer software listed in the Directory, which is available through NTIS, was created by Federal agencies to meet their diverse but quite specific objectives. The software is provided without installation, support, or maintenance services and sometimes requires modifications to run effectively in customer environments. The Directory is published every two years with annual supplements.

PB80-131006 Not available NTIS
National Bureau of Standards, Washington, DC.
A Taxonomy for Valid Test Workload Generation.
Final rept.,
S. A. Mamrak, and M. D. Abrams. Dec 79, 6p
Pub. in Comput. Mag. 12, n12, p60-65, Dec 79.

The valid generation and use of a benchmark that adequately represents a real system workload as required for various computer performance evaluation studies is affected by the particular evaluation environment in which the benchmark is to be used. A taxonomy of test environments is presented in this paper, along with a specification of which test workload generation methods are valid in each evaluation context. The primary impact of the taxonomy is the clear identification of the relatively small number of evaluation environments in which valid workload generation methodologies have been developed. The transfer of a valid methodology to a new environment is shown to often invalidate that methodology. A methodology based on statistical pattern recognition techniques is proposed as the best candidate for a general solution to the workload characterization problem in most evaluation environments.

PB80-131790
(Order as PB80-131766, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Engineering Lab.
Generators for Discrete Polynomial L1 Approximation Problems,
P. Domich, J. Lawrence, and D. Shier. 27 Jun 79, 34p
Included in Jnl. of Research of the National Bureau of Standards, v84 n6 p455-488, Nov-Dec 79.

Polynomial approximation problems represent a class of specially structured problems which are frequently encountered in empirical curve-fitting. Two generators for creating such problems have been developed, implemented and used in the testing of discrete L1 approximation codes. Both generators permit automatic generation of problems with specified characteristics and (for one generator) having known, unique and controllable solutions.

PB80-134919 Not available NTIS
National Bureau of Standards, Washington, DC.
Vision Systems for Manufacturing.
Final rept.,
G. J. VanderBrug, and R. N. Nagel. 1979, 11p
Pub. in Proceedings of the Joint Automatic Control Conference (1979) Held at Denver, CO., on June 17-21, 1979, p760-770 1979.

Most manufacturing processes require a visual inspection of some aspect of the process. In general these tasks are important when the vision system is used in conjunction with a robot manipulator. In robot systems, vision is needed to allow the robot to acquire, manipulate, and inspect parts without the need for elaborate fixturing, or complex part delivery systems. The labor cost of manual inspection, and the high cost of special purpose part delivery systems for robots have led many manufacturers to investigate vision systems, for use in manufacturing. Digital image processing and pattern recognition are providing the basis for a growing number of attempts to achieve an automated vision system. This paper begins with a brief historical perspective on image processing and pattern recognition. Next a series of state of the art examples of visual inspection systems, and then robot vision systems is presented. The paper contains a list of other areas in manufacturing for the application of vision systems, and concludes with an assessment of the future of vision systems in manufacturing.

PB80-134935 Not available NTIS
National Bureau of Standards, Washington, DC.
A Vision System for Real Time Control of Robots.
Final rept.,
G. J. VanderBrug, J. S. Albus, and E. Barkmeyer. 1979, 19p
Pub. in Proceedings of the International Symposium on Industrial Robots (9th) Held at Washington, DC., on March 13-15, 1979, p213-231 1979.

This paper describes a robot vision system which consists of a solid state camera, a strobographic light source, and an 8-bit microprocessor. The camera is mounted obliquely at the wrist of the robot, so that its field of view covers a region extending from inside the finger tips out to a distance of one meter. The light source flashes a plane of light parallel to the wrist of the robot into this region. The plane of light strikes any object in this region and produces an image of line segments. The system computes a run length encoding representation of line segments. Interpretation algorithms are based on the fact that triangulation gives range data, the slope of the lines indicate the orientation of the object, and the end points of the lines give information on the edges to be grasped.

PB80-141922 PC **A05**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
HONEYWELL Information Systems COBOL CB3.1.
Validation summary rept.
18 Jan 80, 81p CCVS74-VSR475
See also PB80-141948.

This Validation Summary Report (VSR) for the HIS LEVEL 66 DPS COBOL Compiler Version CB3.1 (GCOS Version 4JS1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the high level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-141930 PC **A05**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Federal CSS, Inc. IBM 360/370 OS/VS COBOL Release 2.2, PTR 1 Through 6.
Validation summary rept.
28 Jan 80, 99p CCVS74-VSR435
See also PB80-141922.

This Validation Summary Report (VSR) for the Federal CSS IBM OS/VS COBOL Compiler Version 2.2 PTR 1-(6 VP/CSS Version .302) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the high level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-141948 PC **A04**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Northern Telecom Systems Corporation NTSC 4XX COBOL/3.
Validation summary rept.
25 Jan 80, 57p CCVS74-VSR495
See also PB80-141930.

This Validation Summary Report (VSR) for the Northern Telecom Systems Corp. COBOL Compiler Version /3(NTSC Version 3.2) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the low-intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-143084 PC **A03**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
Programming EPROMs and Handling Paper Tape Files Using the INTEL SDK-85 Microprocessor Development Kit. User Manual,
J. W. Hemmings. Nov 79, 41p CSIR-CENG-297, ISBN-0-7988-1746-1

Hardware additions to the standard INTEL SDK-85 kit are presented which make it possible to read and write paper tapes, using a standard teletype, and to program type 8755 EPROMs (UV Eraseable, Electrically reprogrammable Read Only Memory). Programs developed for loading paper tape binary files, punching binary paper tape files, writing a section of the RAM (Random Access Memory) onto an EPROM, writing a binary paper tape onto EPROM and editing paper tape binary files are presented together with detailed instructions for their use. This manual assumes a working knowledge of the SDK-85 kit.

PB80-806045 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Semiconductor Computer Storage (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
William E. Reed. Mar 80, 304p
Supersedes NTIS/PS-79/0194, NTIS/PS-78/0213, and NTIS/PS-77/0213.

The bibliography presents Federally-sponsored research on practical operation, testing systems, fabrication, and design of semiconductor computer storage devices. Trends and forecasts are also presented for semiconductor technology in computer storage systems. (This updated bibliography contains 297 abstracts, 26 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

AD-A079 544/3 PC **A04**/MF **A01**
California Univ Livermore Lawrence Livermore Lab
Probabilistic Approach to EMP Assessment,
R. M. Bevensee, H. S. Cabayan, F. J. Deadrick, L. C. Martin, and R. W. Mensing. Aug 79, 51p Rept no. UCRL-52804
Contract W-7405-eng-48
Presented at the Defense Nuclear Agency-sponsored symposium on 'System EMP Hardening', 7-9 Aug 79.

The development of nuclear EMP hardness requirements must account for uncertainties in the environment, in interaction and coupling, and in the susceptibility of subsystems and components. Typical uncertainties of the last two kinds are briefly summarized, and an assessment methodology is outlined, based on a probabilistic approach that encompasses the basic concepts of reliability. It is suggested that statements of survivability be made compatible with system reliability. Validation of the approach taken for simple antenna/circuit systems is performed with experiments and calculations that involve a Transient Electromagnetic Range, numerical antenna modeling, separate device failure data, and a failure analysis computer program. (Author)

AD-B010 439/8 PC **A02**/MF **A01**
Electronics Engineering Group (1842ND) Richards-Gebaur AFB Mo
Survey of 603 Tactical Communications Squadron (TCS) Grounding System at Sembach Air Force Base, Germany.
Technical rept.,
John F. Zych, and Harold D. McRaney. 15 Mar 76, 13p Rept no. 1842 EEG/EPEU-TR-76-6
Distribution limitation now removed.

Survey of the 603 tactical communications squadron (TCS) on-site grounding system located at Sembach AFB, Germany by representatives of the 1842 EEG and the 1839 electronics installation group in order to investigate and recommend corrective action to eliminate the source of 400 Hertz 'hum' on communication circuits between the 603 TCS and 2134 communications squadron technical control facility. (Author)

N79-76935/2 PC **A15**/MF **A01**
Federal Aviation Administration, Washington, DC. Airway Facilities Service.
Fundamental Considerations of Lightning Protection, Grounding, Bonding, and Shielding.
28 Jul 78, 331p

This report provides theoretical derivations and theory associated with lightning protection, grounding, bonding, and shielding that show why specific details are important and must be taken into account by Headquarters and Regional Design Engineers when designing new facilities and equipment. Reasons why particular methods are best for providing effective lightning protection, grounding, bonding, and shielding are also included.

9D. Information Theory

AD-A079 546/8 PC **A02**/MF **A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
Information and Filtering,
R. S. Bucy. Oct 78, 11p USCAE-53-4514-1792, AFOSR-TR-79-1074
Grant AFOSR-76-3100
Pub. in Information Sciences, v18 p179-187 1979.

No abstract available.

AD-A079 672/2 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Envelope Spectra for Signals and Noise in Vertically Directional Beams.
Summary rept.,
Victor C. Anderson. 20 Nov 78, 16p Rept no. MPL-U-41/78
Contract N00014-75-C-0749
Pub. in Jnl. of the Acoustical Society of America, v65 n6 p1480-1487 Jun 79.

No abstract available.

AD-A079 675/5 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Digital Beamformer.
Summary rept.,
Victor C. Anderson. 1979, 13p Rept no. MPL-U-43/79
Contract N00014-75-C-0749
Pub. in SBIE Proceedings, v80, Real-Time Signal Processing II, p68-73 1979.

No abstract available.

AD-A079 795/1 PC **A07**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
Optimum Detection of a Randomly Frequency-Modulated Carrier.
Technical rept.,
Albert H. Nuttall. 2 Oct 79, 137p Rept no. NUSC-TR-6177

The logarithm of the likelihood ratio for detection of a frequency-modulated signal tone, received in the presence of white Gaussian noise, is derived and expressed in the form of an infinite Volterra series. The amplitude of the received signal tone and the received noise power density level are presumed known; the additive phase shift is uniformly distributed; and the frequency-modulating process is Gaussian, with a spectrum such that no carrier tone remains in the frequency-modulated signal spectrum. This is called a fully-random signal herein. When the time-bandwidth product (of observation time and signal bandwidth) is large enough, and there is at least a moderate amount of frequency modulation, the optimum processor is well-approximated by a filter followed by an energy detector; the filter passband is that of the spectrum of the received signal. The frequency modulation is termed moderate when the ratio of the RMS frequency deviation to the equivalent bandwidth of the frequency-modulating process is of the order of 2-3. Numerous approximations have been necessary to facilitate evaluation of some of the multiple integrals; to what degree the sufficient conditions cited above can be relaxed, without violating the conclusions, is unknown.

AD-A080 020/1 PC **A03**/MF **A01**
Communications Research Centre Ottawa (Ontario)
A Comparison of the Burg and the Known-Autocorrelation Autoregressive Spectral Analysis of Complex Sinusoidal Signals in Additive White Noise,
R. W. Herring. Sep 79, 37p Rept no. CRC-1326

Burg's algorithm for Maximum Entropy autoregressive spectral estimation is analyzed for the cases of one and two complex sinusoidal signals in additive white noise. For the latter case are found two biases which can account for the line splitting and line shifting that occur in simulation studies when the SNR is very high. These biases vanish completely if the two complex sinusoids are in phase quadrature at the middle of the data record; if there is an integral number of half-cycles of difference frequency contained in the data record, then the power level of the spectral estimate will be biased although the effects believed to cause splitting and shifting will be eliminated. Results of simulation studies to support these conjectures are presented. (Author)

9E. Subsystems

AD-A079 588/0 PC **A09**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
GaAs Analog Integrated Circuits (GaAs RF-LSI). Phase I. Progress Report. Volume I. Technical.
Rept. for 5 Jun 78-5 Jun 79.
Aug 79, 185p
Contract N00039-78-C-0305
See also Volume 2, AD-A079 589.

The overall objective of the GaAs RF-LSI Development Program is the development of a family of monolithic GaAs analog integrated circuits operating at frequencies through X-band, and the imple-

mentation of a monolithic X-band receiver which combines a number of these building block circuits. The aim of the first phase effort was to amass the analysis, design, and process technology tools with which to implement the building block circuits and later the receiver. The general objective of Phase I, Device, Process and Circuit Techniques Investigation, was to undertake the device and process technology development necessary to support the Phase II, MSI Building Block Development. Closely coupled with the actual process development were theoretical studies addressing optimization of devices and circuit techniques for monolithic implementation. The following is a brief task by task summary of the work accomplished. The sections which follow this introduction are expanded discussions of each of the tasks.

AD-A079 589/8 MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
GaAs Analog Integrated Circuits (GaAs RF-LSI). Phase I. Progress Report. Volume II. Appendices.
Rept. for 5 Jun 78-5 Jun 79.
Aug 79, 151p
Contract N00039-78-C-0305
See also Volume 1, AD-A079 588.
Availability: Microfiche copies only.

For abstract see AD-A079 588.

AD-A079 899/1 CP **T04**
Naval Air Development Center Warminster PA
Fuselage Mounted Antenna Pattern Prediction Computer Program.
Models-simulation,
Walter D. Burnside, and David S. Lang. Feb 79,
Mag tape DOD-DF-79-002
Source tape is in EBCDIC character set. Tape(s) can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity, Call NTIS Computer Products if you have questions. $300.00 T04 Price includes documentation, AD-A065 587.

This tape contains one source computer program. It is named the 'OSWON' program. This program can be used to predict an antenna radiation pattern for up to 9 fuselage mounted antennas. The aircraft's fuselage, wings, horizontal stabilizers, and veritcal stabilizers can be modeled in the program. The program will compute information necessary for polar antenna pattern plots. If the plots are desired, a magnetic tape drive may be used. The generated tapes from this program can be used on a California Computer Products CALCOMP pen plotter, model 763, to produce the desired antenna patterns...Software description: The program is written in the FORTRAN IV programming language for initial use on a CDC 6600/CYBER 170 computer using the Kronos 2.1 operating system. 29K bytes of core storage are required for use on a CDC 6600/CYBE R 170 computer. (Author)

AD-A079 900/7 CP **T04**
Naval Air Development Center Warminster PA
Wing Mounted Antenna Pattern Prediction Computer Program.
Models-simulation,
Walter D. Burnside, and David Lang. Feb 79,
Mag tape DOD-DF-79-003
Source tape is in EBCDIC character set. Tape(s) can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products if you have questions. $300.00 T04 Price includes documentation AD-A065 589.

This tape contains one source computer program. It is named the OSUOFF program. This program can be used to predict antenna patterns for up to 50 antennas in the presence of various structures which can be simulated by finite flat plates, an infinite ground plane, and/or a finite elliptic cylinder. An application of this program is to obtain antenna patterns of antennas mounted on the wing of an aircraft. This program will compute information necessary for polar antenna pattern plots. If the plots are desired, a magnetic tape drive may be used. The generated tapes from this program may be used on a California Computer Products CALCOMP pen plotter, model 763, to produce the desired antenna patterns...Software description: This program is written in the FORTRAN IV programming language for initial use on a CDC 6600/CYBER 170 computer using the KRONOS 2.1 operating system. 29K bytes of core storage are required for use on a CDC 6600/CYBER 170 computer. (Author)

AD-A079 961/9 PC **A08**/MF **A01**
Kentucky Univ Lexington Dept of Electrical Engineering
On the Physical Realizability of Broad-Band Equivalent Circuits for Wire Loop and Dipole Antennas.
Interim rept. 1 Sep 77-31 May 79,
Gary W. Streable, and L. Wilson Pearson. May 79, 159p RR-79-1, AFOSR-TR-80-0003
Grant AFOSR-77-3452

Results of a study of the feasibility of using Singularity Expansion Method (SEM) data to synthesize broad-band equivalent circuits for loop and wire structures are reported. The positive realness of admittances derived are studied, on the basis of both pole-pair groupings and eigenmode groups within the SEM formalism. Synthesized circuits are given for a center-driven and a quarter-driven straight wire antenna, and for a circular loop. Results are compared with those derived by means of numerical solution of the time-dependent integral equations for each structure. The sensitivities of the response to changes in the values of poles and to circuit element values are considered. (Author)

AD-A079 962/7 PC **A03**/MF **A01**
Kentucky Univ Lexington Dept of Electrical Engineering
On the Physical Realizability of Broadband Lumped-Parameter Equivalent Circuits for Energy-Collecting Structures.
Final rept.,
L. Wilson Pearson, and Donald R. Wilton. Jul 79, 44p RR-79-2, AFOSR-TR-80-0004
Grant AFOSR-77-3452
Prepared in cooperation with Mississippi Univ., University. Dept. of Electrical Engineering.

The practical implementation of equivalent circuits which represent the energy delivered to an arbitrary load impedance by an antenna or a port on a scatterer is discussed. Particular attention is paid to the positive-real function issues associated with the equivalent admittance of the structure when evolved from the point of view of the Singularity Expansion Method. A proof is given which establishes that the admittances associated with current eigenmode contributions to the total current are individually positive-real functions. An ad hoc approach to approximating these admittances with simpler pole-pair positive-real admittances is given for high-Q structures. A brief survey of the applicable circuit synthesis algorithms and their features is provided. Some fundamental considerations in the implementation of the sources representing the energy coupled from the incident wave are presented. (Author)

AD-A080 010/2 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Sweep Generator, SHF,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2086
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. (Author)

AD-A080 055/7 PC **A06**/MF **A01**
Harry Diamond Labs Adelphi MD
Interactive Electronic Circuit Simulation on Small Computer Systems.
Technical memo.,
Brian L. Biehl. Nov 79, 123p Rept no. HDL-TM-79-30

The feasibility is determined of using small computer systems (including programmable desktop calculators and minicomputers) for interactive electronic circuit simulation. Several aspects of the simulator architecture are considered: the computer language, the data word format, the computing speed, and the computer memory configuration. Interactive circuit simulation on programmable desktop calculators is investigated using simulator program BIAS-D (BASIC), written in BASIC for HP9830A desktop calculator. Analysis techniques are presented which conserve memory and advantage of the idiosyncrasies of these small computers. Interactive-mode circuit simulation and batch-mode simulation on minicomputers are compared relative to the simulator architecture and required simulation speed. The more significant speed- and memory-dependent algorithms, used in circuit simulators are compared in detail. Also compared are the execution speeds of several different minicomputer systems, including the HP2100, the PDP 11/45, and the PRIME 400. The speed and memory requirements of these minicomputers executing BIAS-D are compared to an IBM 370/168 also executing BIAS-D. A new method for computing small-signal frequency response is introduced. Because complex arithmetic is not required, this technique is particularly suited to minicomputer simulators and requires minimal additional memory when implemented in a circuit simulator with a transient analysis capability. The frequency response of both linear and nonlinear circuits can be modeled, as can that of high-Q circuits. Magnitude and phase errors of less than 1 percent and 0.5 degrees, respectively, are easily attainable.

AD-A080 095/3 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Turner Lab for Electroceramics
The Effects of Substrate Composition on Thick Film Circuit Reliability.
Quarterly rept. no. 3, 1 Aug-31 Oct 79,
R. W. Vest. 30 Nov 79, 31p
Contract N00019-79-C-0240

Measurements of the density of, and the ripening of RuO2 in, thick film glasses as a function of temperature and amount of ALSiMag 614 (96% AL2O3) substrate dissolved in the glasses were conducted. The minor constituents (4%) in the substrate were found to have an anomalously large effect on the density. The ripening results were interpreted in terms of a phase boundary reaction rate limiting step, and the transfer coefficient was calculated from the data. A theoretical equation was derived for the initial stage sintering kinetics of RuO2 in the glass. This equation was combined with the results of the ripening study to predict the neck growth between RuO2 particles as a function of temperature and amount of dissolved substrate. (Author)

AD-B009 355/9 PC **A09**/MF **A01**
Fairchild Camera and Instrument Corp Mountain View Calif Fairchild Semiconductor
Manufacturing Methods for Radiation-Hardened Multiple IC Chip Package.
Final rept. May 72-May 75,
C. J. Dell'Oca, R. W. Marshall, R. J. Kopp , and D. K. Myers. Sep 75, 193p AFML-TR-75-156
Contract F33615-72-C-1125
Distribution limitation now removed.

Investigations are described which lead to the implementation of manufacturing methods and processes for fabrication by aluminum anodization of single and dual layer metal interconnects for radiation hardened integrated circuits. In addition, an all aluminum, radiation hardened, multichip assembly method is described that completely eliminates flying wires and achieves a high chip packing density in a hermetically sealed package. These manufacturing methods are demonstrated by the fabrication of anodized radiation hardened integrated circuits and by the fabrication of a multichip six bit adder, each containing twelve anodized and/or inverter TTL gates and four anodized quad two input NAND gates. (Author)

AD-B015 616/6 PC **A03**/MF **A01**
Rome Air Development Center Griffiss AFB N Y
Experimental Simulated Plasma Results on Base-Mounted Antennas,
Nicholas V. Karas , and John D. Antonucci. Jun 76, 34p Rept no. RADC-TR-76-194
Distribution limitation now removed.

A study is made of the performance of base-mounted antennas on a reentry nose cone. The

effects of a simulated overdense plasma on flush mounted cavities and protruding J-slot antennas (located respectively in and on a cone base) have been investigated. Changes in radiation patterns for various distances of simulated overdense plasma extending backward from the rim of the cone base are shown, as are Smith chart presentations of the input impedance. Additionally, bandwidth data and coupling data are also presented for both types of antennas. Finally, the voltage breakdown levels for the J-slot, both air filled and dielectric filled, were determined. (Author)

AD-B026 145/3 PC **A06**/MF **A01**
Hughes Aircraft CO Torrance Calif Electron Dynamics Div
Sources Development for Millimeter-Wave Applications.
Final technical rept. 16 Jun 75-16 Dec 76,
Y. Chang, J. M. Hellums, J. A. Paul, and K. P. Weller. Feb 77, 121p EDD-W-41334-F, ECOM-75-1357-F
Contract DAAB07-75-C-1357
Distribution limitation now removed.

The objective of this program is the design, fabrication, testing, and evaluation of 60 GHz and 94 GHz high power FM IMPATT DIODE transmitter oscillators and low noise local oscillators system tested for 100 megabits per second data rate communication at bit error rates (BER) of less than 10 to the -7th near the FM threshold. During the duration of this program, silicon double-drift IMPATT diodes on both copper and diamond heatsinks have been utilized and IMPATT transmitter oscillators of over 275 mW output power at 94 GHz and over 400 mW output power at 60 GHz have been developed. In addition, varactor tuned IMPATT diode local oscillators at 60 and 94 GHz frequencies have also been developed. System performance evaluation of these oscillators achieved BER of less than 10 to the -8th at signal-to-noise ratios meeting the program goal. (Author)

PAT-APPL-6-082 355 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Circuit for the Adaptive Suppression of Narrow Band Interference.
Patent Application,
W. G. Eaton. Filed 5 Oct 79, 15p AD-D006 822/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Adaptive suppression of narrow of band interference is realized by a filter that automatically makes estimates of interfering signals in the frequency domain and separates the interference from the desired signal. Received analog signals are Fourier transformed in accordance with a CHIRP Z algorithm, squared, and filtered by an N point serial structural CCD to provide a smoothed power spectral density signal. The smoothed power spectral density signal is utilized to cancel interfering signals by any one of three mechanizations. One mechanization comprehends a threshold circuit that generates binary signals in response to the CCD output. The binary signals control a gate that gates strong frequency components (the estimates of the interfering frequency coefficient) from the Fourier transformer through to an inverse Fourier transformer. The inverse Fourier transformed strong frequency components are then subtracted from the delayed received analog signal. A second mechanization transmits the full Fourier transformed spectrum to the inverse Fourier transformer and utilizes the gate to notch out the strong frequency components in response to the CCD output. The third mechanization weights the Fourier transformed frequency coefficients with the smoothed power spectral density signal, inverse transforms the weighted spectrum and subtracts it from the delayed analog signal.

PAT-APPL-6-091 993 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Broadband Mode Suppressor for Microwave Integrated Circuits.
Patent Application,
James D. Woermbke. Filed 7 Nov 79, 10p AD-D006 892/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Microwave integrated circuits are enclosed in metal boxes, as more functions are added to circuits RF moding increases, one method of minimizing RF moding is to place a post in the box, this invention broadens the band of frequencies controlled by the post method by attaching a lossy RF absorbing pellet to the end of the mode suppression post. (Author)

PAT-APPL-6-092 817 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Slot Chevron Element for Periodic Antennas and Radomes.
Patent Application,
Robert M. Van Vliet. Filed 9 Nov 79, 11p AD-D006 832/0
Availability: This Goverment-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to structural patterns for resonant windows in the RF region of the electromagnetic spectrum, which patterns are comprised of multiple chevron shaped elements. A high density of the elements is attained by interlocking elements into rows and interlacing rows into patterns readily conforming to curvilinear contours. When necessary to route lightning strikes or provide load carrying structural support, the row organization of the chevron shaped elements lends itself to retaining substantially straight intermediate paths without severely affecting the electromagnetic characteristics of the window. the ability to alter the orientation of the chevron legs in the elements while retaining the substantial character of the row configurations permits a designer to change the performance characteristics of the window without modifying its response to circularly polarized electromagnetic energy.

PATENT-4 162 533 Not available NTIS
Department of the Navy Washington DC
Time Compression Correlator.
Patent,
David P. Ricci. Filed 30 Jan 78, patented 24 Jul 79, 11p AD-D006 858/5, PAT-APPL-873 324
Supersedes PAT-APPL-873 324-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A shift register time compression correlator for determining the degree of coincidence between two signals designed specifically for battery power or other power limited applications. The correlator introduces variable delays to one input signal and compares the delayed input signal with the other input signal which remains undelayed. The output is a stream of digital pulses, the density of which is a measure of the degree of coincidence between the two input signals. (Author)

PATENT-4 170 013 Not available NTIS
Department of the Navy Washington DC
Stripline Patch Antenna.
Patent,
Lawrence M. Black. Filed 28 Jul 78, patented 2 Oct 79, 6p AD-D006 862/7, PAT-APPL-929 060
Supersedes PAT-APPL-929 060-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a conformal antenna having a microstrip patch centered below a slot in a groundplane and covered by a dielectric window and coupled to a stripline feed. (Author)

PATENT-4 171 525 Not available NTIS
Department of the Navy Washington DC
VLF Loop Array Antenna.
Patent,
Elwin W. Seeley. Filed 5 Apr 78, patented 16 Oct 79, 7p AD-D006 865/0, PAT-APPL-893 548
Supersedes PAT-APPL-893 548-78, AD-D004 972.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a directional loop array antenna for very low frequency (VLF) reception. The array comprises four closely spaced loop antennas forming a unidirectional reception pattern with a main beam of less than 43 deg between half power points. The array combines two double loop coaxial antennas dispersed with their axis parallel along 45 deg lines. The signal from one double loop array is delayed sufficiently such that a unidirectional reception pattern is formed.

PATENT-4 177 438 Not available NTIS
Department of the Navy Washington DC
Surface Acoustic Wave Modulator Using Single Crystal Films of Lithium Ferrite.
Patent,
Carmine Vittoria. Filed 18 Jul 78, patented 4 Dec 79, 4p AD-D006 874/2, PAT-APPL-925 726
Supersedes PAT-APPL-925 726-78, AD-D005 239.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A surface acoustic wave (SAW) device formed by an unitary insulating, magnetostrictive ferrite, slab whose easy axis of magnetization is initially (prior to the application of a d.c. magnetic biasing field) perpendicular to the direction of SAW-wave propagation. For example, the easy axis of magnetization in a single-crystal lithium ferrite slab is the less than 111 greater than axis. Therefore this axis is aligned perpendicular to the SAW wave propagation direction and parallel to the edges of the SAW device. Application of a dc magnetic field swings the magnetic moments such that they will be parallel with the SAW wave propagation. Materials useful in carrying out this invention are those which have (1) an easy axis of magnetization, (2) good insulator qualities and (3) the magnetostrictive property. A dc magnetic field is applied parallel with the SAW direction or perpendicular to the easy axis of the material in order to align the magnetic moments in the direction of the SAW wave propagation. Such alignment of the magnetic moments of the material causes a delay in propagation time of the SAW wave. (Author)

PATENT-4 177 468 Not available NTIS
Department of the Navy Washington DC
Inflatable Cavity-Backed Annular Slot Transmitting Antenna.
Patent,
Elwin W. Seeley, and Verne E. Hilderbrand. Filed 5 Sep 78, patented 4 Dec 79, 3p AD-D006 875/9, PAT-APPL-939 735
Supersedes PAT-APPL-939 735-78, AD-D005 432.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a transmitting antenna that can be inflated with air or a liquid dielectric and floated in seawater. It consists of a cuplike cavity backing a radiating annular slot antenna. It can be used to communicate to submarines or surface ships or as a navigation transmitting antenna. It is small compared to the wavelength of the operating frequency. (Author)

PATENT-4 184 125 Not available NTIS
Department of the Air Force Washington DC
Analog Tuning Voltage Circuit with Analog Signal Multiplexing.
Patent,
James F. Mullally. Filed 7 Jul 78, patented 15 Jan 60, 5p AD-D006 840/3, PAT-APPL-922 601
Supersedes PAT-APPL-922 601-78, AD-D005 360.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is an analog tuning circuit, suitable for multiplexing, having a field-effect transistor connected to the output of an operational amplifier with the drain connected in a feedback loop to the inverting input of the amplifier. (Author)

PATENT-4 185 247 Not available NTIS
Department of the Air Force Washington DC
Means for Reducing Spurious Frequencies in a Direct Frequency Synthesizer.
Patent,

Earnest R. Harrison, Jr. Filed 3 Jan 78, patented 22 Jan 80, 5p AD-D006 844/5, PAT-APPL-866 743
Supersedes PAT-APPL-866 743-78, AD-D004 706.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Spurious frequencies are eliminated in a direct frequency synthesizer by means of a feed forward correction circuit. The improved direct frequency synthesizer of the invention includes a series adder, clocked register, a D/A converter and a phase corrector. The adder is inputted by a digital control increment and the output of the register. The system clock frequency is divided down by a smoothing counter that in part controls the phase of the output signal. Spurious frequencies are manifested by overflow of the register. The register overflow is converted to an analog signal by the D/A converter. The system output is provided by a voltage controlled oscillator that is controlled by an amplifier which is responsive to both the smoothing counter output and the analog output of the D/A converter. Additionally, the D/A converter is sampled twice for every cycle of output frequency, resulting in a doubling of the output frequency for a given D/A converter. (Author)

9F. Telemetry

N80-16090/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Grouped Binary Time Code for Telemetry and Space Applications.
A. R. Chi. Dec 79, 25p NASA-TM-80606
Conf-Presented at Intern. Telemetering Conf., San Diego, Calif., 19-21 Nov. 1979.

A computer oriented time code designed for users with various time resolution requirements is presented. It is intended as a time code for spacecraft and ground applications where direct code compatibility with automatic data processing equipment is of primary consideration. The principal features of this time code are: byte oriented format, selectable resolution options (from seconds to nanoseconds); and long ambiguity period. The time code is compatible with the new data handling and management concepts such as the NASA End-to-End Data System and the Telemetry Data Packetization format.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A079 819/9 Not available NTIS
Hawaii Univ Honolulu Dept of Meteorology
Prospecting for Meteorological Energy in Hawaii,
C. S. Ramage. 1979, 9p Rept no. UHMET-78-5
Grants NSF-AER76-06696, EG-77-G-03-1617
Availability: Pub. in Bulletin of the American Meteorological Society, v60 n5 p430-438 May 79 (No copies furnished by DTIC).

No abstract available.

N80-16449/4 PC **E07**
National Aeronautics and Space Administration, Washington, DC.
Energy: A Continuing Bibliography with Indexes, Issue 23.
Oct 79, 882p NASA-SP-7043(23)

This bibliography lists 1786 reports, articles, and other documents introduced into the NASA scientific and technical information system from July 1, 1979 through September 30, 1979.

N80-16453/6 PC **A20**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Large Wind Turbine Design Characteristics and R and D Requirements.
S. Lieblein. Dec 79, 459p NASA-CP-2106, CONF-7904111
Conf-Conf. Held at Cleveland, 24-26 Apr. 1979; Sponsored in Part by Doe.

No abstract available.

N80-16492/4 PC **A03**/MF **A01**
Wyle Labs., Inc., Huntsville, AL.
Outdoor Test for Thermal Performance Evaluation of the Owens-Illinois Sunpack Sec-601 (Air) Solar Collector.
Dec 79, 28p NASA-CR-161339, WYLE-TR-531-37R
Contract NAS8-32036
Subm-Sponsored in Part by DOE Prepared for IBM Federal Systems Div., Huntsville, Ala.

The test procedures used and the test results obtained during the performance of an evaluation test program on the Owens-Illinois Sunpak, model SEC-601, air solar collector under natural outdoor weather conditions are presented. All testing activities were performed on a single module. The test was performed and the data evaluated as applicable to outdoor testing of solar collectors.

PB80-126956 PC **A10**/MF **A01**
Bechtel National, Inc., San Francisco, CA. Research and Engineering.
Projected Annual Resource Requirements at the National and Regional Level for the Department of Commerce Energy Forecast 1985 and 2000,
Andrea L. Watson, and Ralph G. J. Zimmerman. Mar 79, 205p
Contract C-A06-A01-78-00-1321
See also PB-266 240.

This report presents an analysis of the national and regional resource requirements (capital, material, manpower, etc.) associated with future energy development in the U.S. This analysis, using Bechtel's Energy Supply Planning Model (ESPM) indicates projected cumulative capital requirements of $1.6 trillion (January 1978 dollars) during the 1977-2000 forecast period. The largest requirements by energy sector are for electric power generation facilities (53%) coal-fired plants in particular. Although the U.S. is projected to become more and more dependent upon western energy resources, both capital and labor requirements are projected to move from Western to Eastern regions - by the year 2000 - again primarily because of electrical generation requirements.

PB80-127202 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
The Potential for Energy Savings with Water Conservation Devices.
Final rept.,
Robert L. Palla, Jr. Jul 79, 33p NBSIR-79-1770

Through a survey of water-related energy use, a relationship between water usage and energy consumption is developed. Results obtained indicate that energy requirements for water heating far exceed those for water supply and wastewater treatment. Based on estimates of residential water consumption with and without water conserving products, the potential for energy savings is assessed. Reduction in household water heating energy consumption of about 35 percent are predicted with the use of conventional water saving products. Also considered in this study are the energy saving potentials of grey water recycling and grey water heat recovery systems.

PB80-130594 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Tire Related Effects on Vehicle Fuel Economy.
Technical rept.,
John Yurko. Jul 79, 20p EPA-AA-SDSB-79-27

This report analyzes the fuel economy results from steady-state and EPA urban cycle tests that were conducted on the track at the Transportation Research Center of Ohio, during Fall 1978, and steady-state tests that were conducted on a twin roll dynamometer at the EPA, MVEL during Spring 1979. Results were obtained for four different sets of radial tires and four different sets of bias belted tires, and at different tire pressures.

PB80-131055 Not available NTIS
National Bureau of Standards, Washington, DC.
The Grand Scheme/An Economist's View of Energy Conservation.
Final rept.,
R. Ruegg. 1979, 19p
Pub. in Proceedings of the Conference Conservation: Energy Management by Design, Held at El Paso, TX., on March 1979, p1-19 1979.

This report gives an overview of the role of economics in planning and implementing energy conservation. It explains how the economist seeks to find the economically efficient balance among the alternatives to nonrenewable energy use. It discusses the use of economic analysis to solve problems of importance to designers, engineers, builders, manufacturers, public utilities, government policy makers, and consumers. A brief case study of the life-cycle cost performance of alternative window systems is presented to show how economic analysis can guide decisions of mutual concern to different members of the building community.

PB80-131907 PC **A07**/MF **A01**
Swedish Council for Building Research, Stockholm.
Energy Demand Analysis: Present Structures and Future Changes in the Swedish Household, Service and Transportation Sectors,
Georg Saros. 1979, 131p ISBN-91-540-3107-9, D12:1979

The study is divided into three parts. The first part deals with the present energy demand structure, where a comparative analysis is carried out of the present energy consumption structure in Sweden, the United States, and France. The two following parts are devoted to possible future changes in the energy demand structure. A sensitivity analysis of the future Swedish energy demand structure is carried out in the second part of this study with the help of a simulation model (the MEDEE-2 model), and an optimization model of studying the future energy demand in the household and service sectors is presented in the third part.

PB80-132152 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Washington, DC., Area Home Heating Oil Supplies Adequate but at Escalating Prices.
22 Jan 80, 42p EMD-80-42

This report discusses the availability and escalating price of home heating oil in the Washington, D.C., metropolitan area. It also discusses the Department of Energy's lack of response to the rising prices.

PB80-132566 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Vehicle Efficiency: Road vs Dynamometer.
Technical rept.,
Bruce Grugett. Aug 79, 12p EPA-AA-SDSB-79-29

The accuracy of results obtained from vehicle fuel consumption measurements performed on a dynamometer in predicting fuel consumption on the road depends upon the ability of the dynamometer to simulate the road experience of the vehicle. A series of steady-state tests were run on a 1976 Mercury Montego on a twin-roll dynamometer at the EPA and on the Transportation Research Center test track in Ohio. Under the conditions of this experiment, significantly different fuel consumption was measured on the track versus the consumption measured on the dynamometer.

PB80-133853 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Evaluation of Energy Conserving Modifications for Water Heaters.
Final rept.,
Robert L. Palla, Jr. Jul 79, 53p NBSIR-79-1783

The effects of various energy-conserving modifications on water heating energy consumption were evaluated based on laboratory tests. Nine storage-type residential water heaters, representative of standard and 'energy-saving' electric, gas, and oil fueled models currently on the market, were obtained for testing. Federally-promulgated water heater test procedures were used to measure the

energy consumption of each unit before and after modifications.

PB80-134018 MF **A01**
Intermediate Technology Publications Ltd., London (England).
The Power Guide: A Catalogue of Small-Scale Power Equipment,
Peter Fraenkel. c1979, 242p
Microfiche copies only.

This guide is intended to help those seeking to buy small-scale power equipment, particularly for use in remote and underdeveloped parts of the world, by indicating a selection of appropriate commercially available power sources. It gives basic information on the pros and cons and the criteria for choosing a variety of different energy conversion systems, together with a selection of internationally available items of equipment and the names and addresses of their manufacturers and agents. Additional material on related consultancy and information services, plus a listing of organizations concerned with research and development in small-scale power production is also included.

PB80-137516 PC **A04**/MF **A01**
New Mexico Energy Inst., Albuquerque.
Waste Heat and Waste Products Recovery Potential for New Mexico.
Final rept.,
Wendell C. Hull, Dennis M. Zallen, and Edward Groth, Jr. Jun 79, 75p NMEI-39

A survey of sources of waste energy in New Mexico was conducted, and results indicate agricultural and municipal wastes offer the greatest potentials for energy recovery or conversion. Feasible processes for recovering energy from these wastes include hydrogasification, pyrolysis and bioconversion; and, in the treatment of municipal refuse, simple incineration to recover energy preceded by recovery of valuable elements for recycling.

PB80-137748 PC **A03**/MF **A01**
Virginia Highway and Transportation and Research Council, Charlottesville.
Alternatives for Energy Conservation in Roadway Lighting.
Final rept. Jul 77-Dec 78,
Marvin H. Hilton. Aug 79, 28p VHTRC-80-R8, FHWA/VA-80/08
Sponsored in part by Virginia Dept. of Highways and Transportation, Richmond.

From a review of some of the possible methods of conserving energy in the operation of roadway lighting, it was concluded that the most favorable alternative would be to convert the existing mercury lighting to the more energy-efficient high pressure sodium lighting. With due consideration being given to traffic operations and safety under the current energy situation, other alternatives were reviewed also and placed in order of preference.

PB80-138498 PC **A03**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Utilization Concerns of Potential Transportation Fuels.
Working paper,
Gretchen Coar. Apr 79, 43p NTPSC/WP-79-37

This paper identifies and discusses the known utilization problems for fuels which have been identified as likely near and mid-term alternatives to petroleum (synthetics from oil shale and coal, and alcohols from various sources). The focus is on distribution and handling, material compatibility, vehicle performance, fuel economy, environmental effects, safety and toxicity, and potential utilization in alternative engines.

PB80-139306 PC **A04**/MF **A01**
NEUS, Inc., Santa Monica, CA.
Biosources Digest, A Journal on Biomass Utilization. Volume 1, Number 3.
Journal publication,
Harry Sobel. Jul 79, 65p NSF/RA-790296
Grant NSF-PFR77-12500

In this issue, recent utilization grants by NSF, USDOE, USDA and miscellaneous grantors are abstracted and identified as to researcher and institution. A rubber analysis procedure inaugurates a new feature section which publicizes laboratory instructions and details for pilot plant operations. A paper on gasohol is reprinted together with abstracts of papers presented at two professional meetings. One paper describes four new egg-shaped digesters being constructed by the City of Los Angeles, and another discusses multi-use oil and hydrocarbon-producing crops in adaptive systems for food, material, and energy production. Recent books and other publications in the field are listed by title, author, cost and report number. A section on 'Short Courses' outlines a course in 'Fundamentals of Biochemical Engineering.' Documents received are identified by author, title, and availability. Also listed are patents pertinent to biomass utilization, sources of new available information, and a schedule of future professional meetings.

PB80-139959 PC **A02**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
Illinois Residential Energy Efficiency Index,
Henry Kurth, David Loos, and Steve Thomas. 1979, 20p ILLDOE-80/03

This report compares the natural gas and electricity consumption in heating Illinois single family dwellings during the heating seasons of '76 - '77. Consumption data was provided by utilities in Illinois and calculated on the basis of BTUs per square feet per heating degree day.

PB80-141898 PC **A08**/MF **A01**
Massachusetts General Court, Boston.
The Potential for Coal in Massachusetts' Energy Future,
Kenneth Rubin, Mitchell Zeemont, and Taia Ergeta. 1979, 171p NSF/RA-790312
Grant NSF-ISP78-04614

Technological alternatives are identified for the implementation of coal and coal-derived fuels for future use primarily in the utility and other industrial sectors across Massachusetts. Included is a discussion of the legislative precedent for and regulation of coal utilization at both the Federal and state levels. Demand forecasts are made for overall energy and for coal under several different sets of assumptions. The conversion of the Brayton Point electric generating station to coal is discussed as exemplary of one way to increase local coal use. Coal supply options are explored including a discussion of location, quantity, costs of extraction, sulfur content, heat content, environmental impacts, and applicable regulations. Transportation alternatives also are considered. Finally, end use technology options and pollution control technologies are discussed in detail.

PB80-147424 PC **A24**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Validation and Assessment Issues of Energy Models: Proceedings of a Workshop Held at the National Bureau of Standards, Gaithersburg, Maryland on January 10-11, 1979,
Saul I. Gass. Feb 80, 564p NBS-SP-569
Sponsored in part by Energy Information Administration, Washington, DC. Library of Congress catalog card no. 79-600216.

This bibliography cites reports on new designs of automobile engines. The engine types include gas turbines, stratified charged engines, steam engines, hybrid engines using electric motors or flywheels, and rotary engines. Many of these studies also cover the problem of improving fuel economy while lowering emissions. Retrofit devices are excluded. (This updated bibliography contains 100 abstracts, 94 of which are new entries to the previous edition.)

10B. Power Sources

AD-A079 551/8 PC **A06**/MF **A01**
Artec Associates Inc Hayward CA
Explosive MHD Research.
Final rept. 1 Apr 76-31 Mar 77,
Stephen P. Gill, Dennis W. Baum, W. Lee Shimmin, and Deb Mukherjee. 31 May 77, 125p
Rept no. FR-119
Contract N00014-75-C-0822

Research on dense nonideal plasmas used in explosive MHD pulse power generators is described. Experiments were performed with three types of explosive plasma sources producing a plasma pressure about 10 kbar and a plasma temperature about 5 eV (58,000 K). A literature survey was performed on theoretical methods for predicting the properties of nonideal plasmas, and calculations were performed using some of the models. Encouraging progress was made in reducing a discrepancy between theory and experiment. (Author)

AD-A079 635/9 PC **A04**/MF **A01**
Hughes Aircraft Co Los Angeles CA Space and Communications Group
High Efficiency Solar Panel, Phase II, Gallium Arsenide.
Interim rept. 15 Sep 77-15 Jan 79,
G. Vendura, S. Kamath, and G. Wolfe. Jul 79, 65p HAC-SCG-90324M, HAC-REF-E0773, AFAPL-TR-79-2058
Contract F33615-77-C-3150

This interim report presents the progress of the GaAs High Efficiency Solar Panel program (Phase II) goal of development of space qualified solar cells of 16 percent efficiency AMO during the period of September 1977 through January 1979. Results of development research involving the basic GaAs substrate, the epitaxial reactors, LPE growth processes, ohmic contacts/metallizations, welding capability, and environmental testing are included. Efforts to increase substrate size and fabrication yield to enhance the feasibility of larger scale GaAs solar cell production are also detailed. (Author)

AD-A079 712/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
N-Type Molybdenum Diselenide-Based Liquid Junction Solar Cells: A Non-Aqueous Electrolyte System Employing the Chlorine/Chloride Couple.
Technical rept.,
Lynn F. Schneemeyer, Mark S. Wrighton, Angelica Stacy, and Michell J. Sienko. 19 Dec 79, 20p Rept no. TR-3
Contract N00014-78-C-0630

Single crystal, n-type MoSe2 is shown to serve as a stable photoanode in an electrochemical cell employing a nonaqueous (CH3CN) solution of Cl2/Cl(-) as the redox active material. The photoanode reaction is 2Cl(-) Cl2 and the cathode reaction is Cl2 2Cl(-). The MoSe2 is qualitatively beter than MoS2 (0.5% efficiency) which has a larger band gap (1.7 eV), but both materials are rugged in the nonaqueous solution while both photocorrode in aqueous Cl(-) solutions. In H2O, the I3(-)/I(-) couple is excellent but in CH3CN it yields lower efficiency than the Cl2/Cl(-) couple. The stable Cl2(-)/Cl(-) system provides evidence that a transparent, reversible, non-02 sensitive redox couple can be useful in n-type semiconductor-based liquid junction cells employing a direct band gap material having optimum solar response.

AD-A079 975/9 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Explosive-Magnetic Generator
A. I. Pavlovskiy, R. Z. Lyudayev, L. N. Plyashkevich, and V. Ye Gurin. 30 Aug 79, 12p
Rept no. FTD-ID(RS)T-1187-79
Trans. of Patent (USSR) 266 100 p1-3, 17 Mar 70, by Bernard L. Tauber.

No abstract available.

N80-16086/4 PC **A20**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study, Phase 2. Volume 2: Reference System Description.
Nov 79, 464p NASA-CR-160443, D180-25461-2
Contract NAS9-15636
Seri-5.

System descriptions and cost estimates for the reference system of the solar power satellite program are presented. The reference system is divided into five principal elements: the solar power satel-

lites; space construction and support; space and ground transportation; ground receiving stations; and operations control. The program scenario and non-recurring costs are briefly described.

N80-16483/3 PC **A04**/MF **A01**
Energy Technology, Inc., Cleveland, OH.
Study of Advanced Radial Outflow Turbine for Solar Steam Rankine Engines.
C. Martin, and T. Kolenc. Dec 79. 74p NASA-CR-159695, DOE/NASA/0086-79/1

The performance characteristics of various steam Rankine engine configurations for solar electric power generation were investigated. A radial outflow steam turbine was investigated to determine: (1) a method for predicting performance from experimental data; (2) the flexibility of a single design with regard to power output and pressure ratio; and (3) the effect of varying the number of turbine stages. All turbine designs were restricted to be compatible with commercially available gearboxes and generators. A study of several operating methods and control schemes for the steam Rankine engine shows that from an efficiency and control simplicity standpoint, the best approach is to hold turbine inlet temperature constant, vary turbine inlet pressure to match load, and allow condenser temperature to float maintaining constant heat rejection load.

N80-16484/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Satellite Power System (SPS).
H. G. Edler. Oct 78, 20p NASA-TM-80943, TID-29094

Potential organizational options for a solar power satellite system (SPS) were investigated. Selection and evaluation criteria were determined to include timeliness, reliability, and adequacy to contribute meaningfully to the U.S. supply; political feasibility (both national and international); and cost effectiveness (including environmental and other external costs). Based on these criteria, four organizational alternatives appeared to offer reasonable promise as potential options for SPS. A large number of key issues emerged as being factors which would influence the final selection process. Among these issues were a variety having to do with international law, international institutions, environmental controls, economics, operational flexibility, congressional policies, commercial-vs-governmental ownership, national dedication, and national and operational stategic issues.

N80-16486/6 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Characterization of Solar Cells for Space Applications. Volume 11: Electrical Characteristics of 2 Ohm-cm, 228 Micron Wraparound Solar Cells as a Function of Intensity, Temperature, and Irradiation.
B. E. Anspaugh, D. M. Beckert, R. G. Downing, and R. S. Weiss. 15 Jan 80, 45p NASA-CR-162686, JPL-PUB-78-15-V-11
Contract NAS7-100

Parametric characterization data on Spectrolab 2 by 4 cm, 2 ohm/cm, 228 micron thick wraparound cell, a candidate for the Solar Electric Propulsion Mission, are presented. These data consist of the electrical characteristics of the solar cell under a wide range of temperature and illumination intensity combinations of the type encountered in space applications.

N80-16487/4 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Evaluation of Concentrated Space Solar Arrays Using Computer Modeling.
D. E. Rockey. 1 Nov 79, 54p NASA-CR-162681, JPL-PUB-79-87
Contract NAS7-100

A general approach is developed for predicting the power output of a concentrator enhanced photovoltaic space array. A ray trace routine determines the concentrator intensity arriving at each solar cell. An iterative calculation determines the cell's operating temperature since cell temperature and cell efficiency are functions of one another. The end result of the iterative calculation is that the individual cell's power output is determined as a function of temperature and intensity. Circuit output is predicted by combining the individual cell outputs using the single diode model of a solar cell. Concentrated array characteristics such as uniformity of intensity and operating temperature at various points across the array are examined using computer modeling techniques. An illustrative example is given showing how the output of an array can be enhanced using solar concentration techniques.

N80-16489/0 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Diffusion Length Measurements of Thin GaAs Solar Cells by Means of Energetic Electrons.
O. Vonross. 1 Feb 80, 17p NASA-CR-162692, JPL-PUB-79-121
Contract NAS7-100

A calculation of the short circuit current density (j sub sc) of a thin GaAs solar cell induced by fast electrons is presented. It is shown that in spite of the disparity in thickness between the N-type portion of the junction and the P-type portion of the junction, the measurement of the bulk diffusion length L sub p of the N-type part of the junction is seriously hampered due to the presence of a sizable contribution to the j sub sc from the P-type region of the junction. Corrections of up to 50% had to be made in order to interpret the data correctly. Since these corrections were not amenable to direct measurements it is concluded that the electron beam method for the determination of the bulk minority carrier diffusion length, which works so well for Si solar cells, is a poor method when applied to thin GaAs cells.

N80-16490/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Potential Performance Improvement Using a Reacting Gas (Nitrogin Tetroxide) as the Working Fluid in a Closed Brayton Cycle.
Final Report.
R. J. Stochl. Dec 79, 23p NASA-TM-79322, DOE/NASA/1060-79/3

The results of an analysis to estimate the performance that could be obtained by using a chemically reacting gas (nitrogen tetroxide) as the working fluid in a closed Brayton cycle are presented. Compared with data for helium as the working fluid, these results indicate efficiency improvements from 4 to 90 percent, depending on turbine inlet temperature, pressures, and gas residence time in heat transfer equipment.

N80-16491/6 PC **A04**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
A 15KWE (Nominal) Solar Thermal Electric Power Conversion Concept Definition Study: Steam Rankine Reheat Reciprocator System.
Final Report.
H. Fuller, R. Demler, E. Poulin, and P. Dantowitz. Jun 79, 63p NASA-CR-159590, DOE/NASA/0062-79/1

An evaluation was made of the potential of a steam Rankine reheat reciprocator engine to operate at high efficiency in a point-focusing distributed receiver solar thermal-electric power system. The scope of the study included the engine system and electric generator; not included was the solar collector/mirror or the steam generator/receiver. A parametric analysis of steam conditions was completed leading to the selection of 973 K 12.1 MPa as the steam temperature/pressure for a conceptual design. A conceptual design was completed for a two cylinder/ opposed engine operating at 1800 rpm directly coupled to a commercially available induction generator. A unique part of the expander design is the use of carbon/graphite piston rings to eliminate the need for using oil as an upper cylinder lubricant. The evaluation included a system weight estimate of 230 kg at the mirror focal point with the condenser mounted separately on the ground. The estimated cost of the overall system is $1932 or $90/kW for the maximum 26 kW output.

N80-16493/2 PC **A04**/MF **A01**
Sundstrand Corp., Rockford, IL.
The 15 kw sub E (Nominal) Solar Thermal Electric Power Conversion Concept Definition Study: Steam Rankine Turbine System.
Final Report.
T. J. Bland. Oct 79, 63p NASA-CR-159589, AER-1713

A study to define the performance and cost characteristics of a solar powered, steam Rankine turbine system located at the focal point of a solar concentrator is presented. A two stage re-entry turbine with reheat between stages, which has an efficiency of 27% at a turbine inlet temperature of 732 C was used. System efficiency was defined as 60 Hertz electrical output divided by absorbed thermal input in the working fluid. Mass production costs were found to be approximately 364 dollars/KW.

N80-16494/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Preliminary Analysis of Performance and Loads Data from the 2-Megawatt MOD-1 Wind Turbine Generator.
D. A. Spera, L. A. Viterna, T. R. Richards, and H. E. Neustadter. 1979, 16p NASA-TM-81408, DOE/NASA/1010-79/5
Contract EX-77-A-29-1010
Conf-Presented at 4TH Biennial Conf. And Workshop on Wind Energy Conversion Systems, Washington, D.C., 29-31 Oct. 1979; Sponsored by DOE.

Preliminary test data on output power versus wind speed, rotor blade loads, system dynamic behavior, and start-stop characteristics on the Mod-1 wind turbine generator are presented. These data were analyzed statistically and are compared with design predictions of system performance and loads. To date, the Mod-1 wind turbine generator has produced up to 1.5 MW of power, with a measured power versus wind speed curve which agrees closely with design. Blade loads were measured at wind speeds up to 14 m/s and also during rapid shutdowns. Peak transient loads during the most severe shutdowns are less than the design limit loads. On the inboard blade sections, fatigue loads are approximately equal to the design cyclic loads. On the outboard blade sections, however, measured cyclic loads are significantly larger than design values, but they do not appear to exceed fatigue allowable loads as yet.

N80-16495/7 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA. Semiconductor Group.
Semiconductor Grade, Solar Silicon Purification Project.
Final Report.
W. M. Ingle, R. R. Rosler, S. W. Thompson, and R. E. Chaney. 10 Dec 79, 173p NASA-CR-162746, DOE/JPL-954442-78/12
Contract JPL-954442

Experimental apparatus and procedures used in the development of a 3-step SiF2(x) polymer transport purification process are described. Both S.S.M.S. and E.S. analysis demonstrated that major purification had occured and some samples were indistinguishable from semiconductor grade silicon (except possibly for phosphorus). Recent electrical analysis via crystal growth reveals that the product contains compensated phosphorus and boron. The low projected product cost and short energy payback time suggest that the economics of this process will result in a cost less than the goal of $10/Kg(1975 dollars). The process appears to be readily scalable to a major silicon purification faciliity.

N80-16885/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Comments on TEC Trends.
J. F. Morris. 1979, 28p NASA-TM-79317, E-273
Conf-Presented at Intern. Conf. On Plasma Sci., Montreal, 4-6 Jun. 1979; Sponsored by IEEE.

A technology assessment of thermionic energy conversion research and technology is presented.

N80-16886/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

Experiments on H2-O2mhd Power Generation.
J. M. Smith. 1980, 18p NASA-TM-81424
Conf-Proposed for Presentation at the 3D World Hydrogen Energy Conf., Tokyo, 23 - 26 Jun. 1980.

Magnetohydrodynamic power generation experiments utilizing a cesium-seeded H2-O2 working fluid were carried out using a diverging area Hall duct having an entrance Mach number of 2. The experiments were conducted in a high-field strength cryomagnet facility at field strengths up to 5 tesla. The effects of power takeoff location, axial duct location within the magnetic field, generator loading, B-field strength, and electrode breakdown voltage were investigated. For the operating conditions of these experiments, it is found that the power output increases with the square of the B-field and can be limited by choking of the channel or interelectrode voltage breakdown which occurs at Hall fields greater than 50 volts/insulator. Peak power densities of greater than 100 MW/cu M were achieved.

N80-16914/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Planar Multijunction High Voltage Solar Cells.
J. C. Evans, Jr., A. T. Chai, and C. Goradia.
1980, 10p NASA-TM-81389, E-299
Conf-Presented at 14TH Photovoltaic Specialists Conf., San Diego, Calif., 7-10 Jan. 1980; Sponsored by IEEE.

Technical considerations, preliminary results, and fabrication details are discussed for a family of high-voltage planar multi-junction (PMJ) solar cells which combine the attractive features of planar cells with conventional or interdigitated back contacts and the vertical multijunction (VMJ) solar cell. The PMJ solar cell is internally divided into many voltage-generating regions, called unit cells, which are internally connected in series. The key to obtaining reasonable performance from this device was the separation of top surface field regions over each active unit cell. Using existing solar cell fabricating methods, output voltages in excess of 20 volts per linear centimeter are possible. Analysis of the new device is complex, and numerous geometries are being studied which should provide substantial benefits in both normal sunlight usage as well as with concentrators.

PATENT-4 151 438
Not available NTIS
Department of Energy, Washington, DC.
Distributed Electrical Leads for Thermionic Converter.
Patent,
G. O. Fitzpatrick, and E. J. Britt. Filed 17 Aug 77, patented 24 Apr 79, 4p PAT-APPL-825 518
Supersedes PAT-APPL-825 518-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a thermionic converter, means are provided for coupling an electrical lead to at least one of the electrodes thereof. The means include a bus bar and a plurality of distributed leads coupled to the bus bar each of which penetrates through one electrode and are then coupled to the other electrode of the converter in spaced apart relation. 6 claims. (ERA citation 05:010233)

PB80-134497 PC **A03**/MF **A01**
Southern Methodist Univ., Dallas, TX.
Polycrystalline Silicon Solar Cells on Low Cost Foreign Substrates,
T. L. Chu, J. C. Lien, H. C. Mollenkopf, S. C. Chu, and K. W. Heizer. 1974, 35p NSF-RA-N-74-443
Grant NSF-GI-38981
Prepared in cooperation with Texas Instruments, Inc., Dallas.

The use of polycrystalline silicon layers on low-cost substrates is a promising approach for the fabrication of low-cost solar cells. Using low-carbon steel and graphite as substrates, solar cell structures have been deposited by the thermal decomposition of silane and appropriate dopants. Steel was selected as a substrate on the sole basis of its low cost. However, steel and silicon are not compatible in their properties, and an interlayer of a diffusion barrier, such as borosilicate, must be used to minimize the diffusion of iron from the substrate into the deposit. The deposited silicon on borosilicate/steel substrates is polycrystalline. P-n junction solar cells were found to have low open-circuit voltages and poor current-voltage characteristics, and Schottky-barrier solar cells were found to show negligible photovoltages. Graphite is more compatible with silicon in properties than steel, and silicon deposited on graphite substrates shows considerably better microstructures.

PB80-137300 PC **A08**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Power Cycles for Large-Scale Generation of Electricity, Results of the NSF-RANN Workshops on Power Cycles,
Robert R. Rothfus. Jan 74, 156p NSF-RA-N-74-441
Grant NSF-GI-38224

Experts from industry, utilities, public agencies, and universities reviewed the relationship between heat sources and power cycles. A power cycle is the means of converting other forms of energy to useful work with attention in the present study devoted to cycles which ultimately generate electricity in large central stations. As the power cycle is the critical link in the chain of processes leading from raw fuel to electricity, attention focused on power cycles and their immediate inputs and outputs together with identification of relevant characteristics of sources and cycle. Workshop sessions dealt with broad categories of heat sources. The Fossil Fuels Panel considered cycles using heat from clean fuels made from oil and coal. The Nuclear Panel discussed the cycle input characteristics of various fission reactors, both breeding and non-breeding. The Geothermal and Solar Panel was concerned with relatively low temperature outputs. A summary of recommendations and an extensive appendix are included.

PB80-139751 PC **A02**/MF **A01**
Solar Solution, Inc., Washington, DC.
Electricity from the Wind: A Guide for the Generalist,
Paul Bendick. 1978, 23p
Sponsored in part by Agency for International Development, Washington, DC.

This guide was compiled and written for the generalist working in developing countries who are considering the option of using wind energy to generate small amounts of electricity. It is not intended to be comprehensive nor should it be read as a technical bulletin. It presents basic information to the reader who knows little about the subject and will help him/her to decide whether wind energy should be explored as a practical answer to a specific energy need. Discussed in the paper are wind electric systems, measuring the wind, determining electrical needs, selecting components, and listings of commercial dealers, manufacturers and distributors. Financial considerations are also discussed.

PB80-141286 PC **A03**/MF **A01**
New Mexico Energy Inst., Albuquerque.
Variable Speed Constant Frequency Voltage Generator (Alternator).
Final rept. 22 Aug 77-30 Jun 79,
W. W. Grannemann. Jul 79, 46p NMEI-44

The objective achieved was constructing the first prototype alternator with digital control of its output frequency for a variable shaft speed, such as a wind machine would have. The first machine is a two-pole alternator with power removed from the rotor through slip rings. The rotating field in the stationary coils of the stator is controlled by the microcircuits. Later, alternators may well have the control circuits and rotating field in the rotor which would be a significant improvement since power would not need to be removed through slip rings. Except for the power amplifiers which drive the stator windings, the control and the comparison circuitry is constructed with available low cost, low power integrated circuits (IC's). Test results from the first prototype demonstrate that the alternator can successfully convert available wind power directly to usable a-c 60 hertz power to supplement line power. The power generated by the alternator can have constant voltage and constant frequency as determined by the local power system and the control circuitry. Variations in the mechanical speed of rotation of the alternator rotor, which are caused by changes in wind velocity, will change the power output of the alternator while the voltage and the frequency remain constant.

PB80-141294 PC **A04**/MF **A01**
New Mexico Energy Inst., Albuquerque.
Preparation of Highly Efficient Solar Cells and Corrosion Studies on Solar Cell Materials.
Final rept. 1 Jul 78-30 Jun 79,
Su-Moon Park. Jul 79, 69p NMEI-46

The application of the Pourbaix diagram to the prediction and understanding of corrosion properties of semiconductor materials has been worked out. With the aid of flat band potential information, the thermodynamic stability of semiconductor materials under various operating conditions, types of electrodes (n- or p-) to be used, conversion efficiencies, types of redox couples to be chosen for a given semiconductor electrode material and the proper operating pH-region can be determined. pH and electrolyte dependencies of flat band potentials have been studied to be able to design more efficient semiconductor-liquid junction solar cells. Various effects of electrolytes on flat band potentials were also studied.

10C. Energy Storage

AD-A079 585/6 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
A Battery for Arctic Radio Repeater Systems.
Technical note,
William A. Armstrong, and William D. Barnes.
Nov 79, 26p Rept no. DREO-TN-79-27
Abstract in French.

The effect of temperature on the working voltage of air depolarized cells (Model 608z, 2000 Ah) at various stages of discharge has been investigated. Discharge currents of 0.2 to 1.0 A at temperatures from 20 C to -55 C were examined as were the effects of increasing the electrolyte concentration from 22% to 27% and 29% KOH. The results confirm that air depolarized cells can form a suitable power source for an unattended 30 W radio repeater station in the arctic if the cells are connected in a series/parallel arrangement such that the current drain from each cell does not greatly exceed 0.2 A. (Author)

AD-A079 687/0 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Nickel-Cadmium Aircraft Batteries: Management for Engine Cranking,
Keival Feldman, and Gaston Verville. Oct 79, 40p Rept no. DREO-816
Abstract in French.

Nickel/cadmium aircraft batteries with Celgard barrier materials may be freely used for cranking turbine engines. However, frequent use for this purpose with insufficient intervening cooling still results in successive increases in battery temperature. The experiments were terminated when 'hot spot' temperatures between the cells reached 100C. Short term experiments indicated no apparent problems. In long term use for cranking, performance was found to deteriorate as water depletion, due to overcharge, became severe. Replacement of water and deep cycling restored the original condition. Improved cranking performance was found with initial electrolyte concentrations below the customary 30% potassium hydroxide. It is emphasized that the above comments do not apply to batteries with cellophane barriers. (Author)

AD-A079 688/8 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Pulse Capability of the AlRi Lead Chloride Electrode.
Technical note,
George J. Donaldson, and William D. Barnes.
Nov 79, 25p Rept no. DREO-TN-79-26
Abstract in French.

The objective of the study was to evaluate the pulse discharge performance of lead chloride electrodes for the active sonobuoy battery application. Experimental work was carried out using Mg/

PbCl2 cells which were pulse discharged in 3.25% artificial seawater at ambient temperatures (22-25 C). Pulses of 100 milliseconds duration were applied every ten seconds by switching the cells from their steady discharge load to the pulse discharge load. It was found that the steady rate of discharge had to be maintained at about 5-10 mA per sq cm in order to permit a sufficiently rapid response to the application of the pulse load without unduly sacrificing electrode capacity. The Mg/PbCl2 cell was required to accept a pulse load greater than the steady load by a factor of approximately 25; the resulting loss of cell output voltage was about 0.6 volts. Although Mg/AgCl cells suffer about the same loss of output, the levels are about 0.5 volts higher in both steady and pulsed discharge modes than those for the Mg/PbCl2 cell. A further serious disadvantages of the PbCl2 electrode is its greater size and weight compared to silver chloride. Lead chloride electrodes do not offer a performance advantage over silver chloride for active sonobuoy batteries. In view of the impending conversion of all types of sonobuoys to the use of lithium batteries in about five to eight years time there is little advantage to pursuing the development of the lead chloride electrode for such applications. (Author)

AD-A079 690/4 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Investigation of Methods to Improve the Low Temperature Charge Acceptance of Lead-Acid Batteries.
Technical note,
Eugene M. L. Valeriote. Oct 79, 35p Rept no. DREO-TN-79-24
Abstract in French.

Investigation of the causes of poor low temperature charge acceptance of the lead acid battery at DREO has been primarily directed towards understanding and improving positive electrode characteristics. However, studies of the negative electrode, of electrolyte and electrode additives, of electrolyte composition, and of charging and heating methods for improving charge acceptance are also discussed. Previous research and recent advances are reviewed. Possible improvements are suggested. Recommendations for further research and development are made, based on the encouraging results of the current work and on the accumulated knowledge represented by the work reviewed. (Author)

AD-B004 957/7 PC **A07**/MF **A01**
Spectrolab Sylmar Calif
Advanced Aluminum-Chlorine Battery for Expendable ECM Devices.
Final technical rept. 15 Sep 72-15 Feb 75,
P. F. Ritterman. Feb 75, 147p AFAPL-TR-75-18
Contract F33615-73-C-2018
Distribution limitation now removed.

The objective of this program was to provide advanced battery technology leading to the development of an improved primary power source, utilizing the activated aluminum anode, for expendable ECM jammers. This battery system, when fully developed, was expected to yield energy densities of 60 Wh/lb and 6 Wh/cu in. at the 45 minute discharge rate. (Author)

AD-B007 515/0 PC **A06**/MF **A01**
Eagle-Picher Industries Inc Joplin Mo Electronics Div
High Rate, Rechargeable, Silver-Zinc Pile Type Battery.
Final rept. May 74-May 75,
L. R. Erisman. May 75, 105p AFAPL-TR-75-51
Contract F33615-74-C-2045
Distribution limitation now removed.

This report describes the work accomplished in the development of a high rate, rechargeable, silver-zinc, pile type battery for the contract period of 1 May 1974 through 1 May 1975. This program is an extension of a preceding study contract, USAF F33615-73-C-2074, and consisted of utilizing component development data to establish processing, fabrication and performance capabilities for a multi-cell pile configuration. A modular system concept using basic 100 kw modules was retained to project accumulated pile test data into systems of the multi-megawatt power range. These studies demonstrated components could be processed and fabricated into submodules capable of assembly into a four megawatt, thirty second system of 3800 pounds and less than 20 cubic feet could be realized. (Author)

N80-16095/5 PC **A22**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Sealed-Cell Nickel-Cadmium Battery Applications Manual.
W. R. Scott, and D. W. Rusta. Dec 79, 523p NASA-RP-1052

The design, procurement, testing, and application of aerospace quality, hermetically sealed nickel-cadmium cells and batteries are presented. Cell technology, cell and battery development, and spacecraft applications are emphasized. Long term performance is discussed in terms of the effect of initial design, process, and application variables. Design guidelines and practices are given.

N80-16488/2 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Manufacturing Methods of a Composite Cell Case for a Ni-Cd Battery.
J. L. Bauer. 15 Dec 79, 59p NASA-CR-162724, JPL-PUB-79-101
Contract NAS7-100

Basic manufacturing method refinements for using graphite epoxy material for a nickel cadmium battery cell case were performed to demonstrate production feasibility. The various facets of production scale-up, i.e., process and tooling development, together with material and process control, were integrated into a comprehensive manufacturing process that assures production reproducibility and product uniformity. Test results substantiate that a battery cell case produced from graphite epoxy pre-impregnated material, utilizing the internal pressure bag fabrication method, is feasible.

N80-16824/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Averaging Battery Model for a Lead-Acid Battery Operating in an Electric Car.
Final Report.
J. M. Bozek. Dec 79, 19p NASA-TM-79321, DOE/NASA/1044-79/5

A battery model is developed based on time averaging the current or power, and is shown to be an effective means of predicting the performance of a lead acid battery. The effectiveness of this battery model was tested on battery discharge profiles expected during the operation of an electric vehicle following the various SAE J227a driving schedules. The averaging model predicts the performance of a battery that is periodically charged (regenerated) if the regeneration energy is assumed to be converted to retrievable electrochemical energy on a one-to-one basis.

PAT-APPL-964 870 PC **A03**/MF **A01**
Department of the Air Force Washington DC
Copper (II) Chloride-Tetrachloroaluminate Battery.
Patent Application,
J. K. Erbacher. Filed 29 Nov 78, 29p AD-D006 819/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A pelletized, light weight, thermal battery having copper (II) chloride and an alkali tetrachloroaluminate as electrolytic components. (Author)

11. MATERIALS

11A. Adhesives and Seals

AD-B008 937/5 PC **A04**/MF **A01**
Trw Systems Group Redondo Beach Calif
PPQ Adhesives for Large Area Bonding of Titanium Alloys.
Final rept. 1 Mar 74-31 May 75,
M. K. O'Rell, C. H. Sheppard, R. W. Vaughan, and R. J. Jones. Aug 75, 59p TRW-25501-6016-RU-00, AFML-TR-75-128
Contract F33615-74-C-5017
Distribution limitation now removed.

A Diels-Alder reaction was investigated as a means to crosslink polyphenyl-quinoxalines (PPQ) which were intended for use as adhesives in large area bonding of titanium alloys. Two promising candidate polymers were identified for process development studies. Double lap-shear specimens were press cure fabricated from the adhesives and Ti-6Al-4V adherends which demonstrated room temperature strengths of 4000 psi and elevated temperature strengths of 2800 psi and 2000 psi at 450 F and 550 F, respectively. Detailed evaluation studies were conducted which included stress durability determinations, crack extension measurements, peel strength measurements and blister detection tests which demonstrated applicability for preparing large area bonded specimens. The results of the detailed testing indicated that the crosslinked PPQ adhesive possessed toughness and that large area bonded specimens can be press cure fabricated. (Author)

AD-B009 649/5 PC **A02**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Materials Dept
Elastomers for Service as Seals for Engine Lubricants and Hydraulic Fluids.
Research and development rept.,
William Klemens, and Paul Lagally. Feb 76, 16p
Rept no. MAT-75-78
Distribution limitation now removed.

Six poly(fluoroalkoxy) phosphazene (PNF) elastomers were examined against a Viton control as candidates for O-rings which can function between -65 F and +350 F. The six PNF-compound vulcanizates represent the most advanced compound technology for PNF. Tensile data clearly show that these six PNF compounds cannot withstand hydraulic fluid MIL-H-83282A at +350 F. The tensile strengths deteriorate rapidly with immersion time. By contrast, the Viton control shows almost no change. While the compression set characteristics of the six PNF compounds show a significant improvement over those previously examined, it is expected that compression set, too, would suffer with increased conditioning time at +350 F in the hydraulic fluid. The low temperature flexibility of PNF vulcanizates is excellent, but other important physical properties show obvious deficiencies, particularly after conditioning in hydraulic fluid at +350 F.

N80-16143/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Some Considerations of the Performance of Two Honeycomb Gas Path Seal Material Systems.
R. C. Bill, and L. T. Shiembob. 1980, 29p NASA-TM-81398, AVRACOM-TR-79-33
Subm-Prepared in Cooperation with Army Aviation Research and Development Command, Cleveland, and Pratt and Whitney Aircraft Group, East Hartford, Conn. Conf-to Be Presented at the Ann. Meeting of the AM. Soc. Of Lubrication Engr., Anaheim, Calif., 5-8 May 1980.

A standard Hastelloy-X honeycomb material and a pack aluminide coated honeycomb material were evaluated as to their performance as labyrinth seal materials for aircraft gas turbine engines. Consideration from published literature was given to the fluid sealing characteristics of two honeycomb materials in labyrinth seal applications, and their rub characteristics, erosion resistance, and oxidation resistance were evaluated. The increased temperature potential of the coated honeycomb material compared to the uncoated standard could be achieved without compromising the honeycomb material's rub tolerance, although there was some penalty in terms of reduced erosion resistance.

N80-16338/9 PC **A05**/MF **A01**
General Electric Co., Cincinnati, OH. Materials and Process Technology Labs.
Program to Develop Sprayed, Plastically Deformable Compressor Shroud Seal Materials.
Interim Technical Progress Report, 29 Jun. 1976 - 28 Feb. 1979.
R. C. Schwab. Nov 79, 78p NASA-CR-159741, ITPR-1
Contract NAS3-20054

A study of fundamental rub behavior for ten dense sprayed materials and eight current compressor clearance materials has been conducted. A literature survey of a wide variety of metallurgical and thermophysical properties was conducted and correlated to rub behavior. Based on these results, the most promising dense rub material was Cu-9Al. Additional studies on the effects of porosity, incursion rate, blade solidity and ambient temperature were carried out on aluminum bronze (Cu-9Al-1Fe) with and without a 515B Feltmetal underlayer.

PAT-APPL-6-088 504 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Acetylene Terminated Matrix and Adhesive Oligomeric Compositions.
Patent Application,
Fred E. Arnold. Filed 26 Oct 79, 15p AD-D006 826/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A composition prepared by mixing a high Tg, acetylene-terminated phenylquinoxaline oligomer with an acetylene-substituted reactive diluent. The presence of the reactive diluent in the mixture effectively lowers the Tg of the oligomer soas to provide the compositon with adequate flow for melt processing. (Author)

PAT-APPL-6-088 505 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Reactive Diluents for Acetylene Terminated Matrix and Adhesive Resins.
Patent Application,
Bruce A. Reinhardt. Filed 26 Oct 79, 11p AD-D006 827/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Acetylene-substituted aromatic ethers having very low class transition temperatures. The compounds are useful as reactive diluents for high Tg, acetylene-terminated phenylquinoxaline oligomers. When mixed with the oligomers, the resulting compositions have a lowered Tg and the necessary flow for melt processing. (Author)

PAT-APPL-6-090 385 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Simplified Electrical Feedthrough System for Pressurized Containers.
Patent Application,
Harry E. Conway. Filed 1 Nov 79, 8p AD-D006 893/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrical feedthrough system for pressurized containers comprising a 'T' shaped flexible member adapted to pass through an opening in the container and an epoxy used as a secondary seal and support, a conductor passes through the 'T' shaped member which maintains a seal around the conductor, electrical connections are made to terminals at either end of the conductor. (Author)

PATENT-4 185 041 Not available NTIS
Department of the Air Force Washington DC
Channel Sealant Compositions.
Patent,
Warren R. Griffin. Filed 2 Sep 77, patented 22 Jan 80, 6p AD-D006 842/9, PAT-APPL-830 227
Supersedes PAT-APPL-830 227-77, AD-D004 387.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A sealant composition comprising a non-crosslinked, elastomeric mastic and an extrusion-inhibiting amount of vulcanzied rubber particles of irregular shape and having sharp edges and angular surfaces. When the composition is used as a channel sealant, the ability of the particles to deform at structural gaps while offering resistance to extrusion prevents the loss of the elastomeric mastic. (Author)

PATENT-4 185 858 Not available NTIS
Department of the Air Force Washington DC
Secondary Seal for Tubing Joined Via V-Band Couplings.
Patent,
Douglas E. Peash. Filed 28 Jun 78, patented 29 Jan 80, 5p AD-D006 850/2, PAT-APPL-920 867
Supersedes PAT-APPL-920 867-78, AD-D005 217.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for sealing the joint between ducts having sheet metal flanges mated with V-band coupings. Seal assemblies are interposed between the V-band coupling and the abutting duct flanges. As the V-band coupling is tightened to draw the ends of the duct flanges together the seal assembly is compressed, deforming the sealing material in contact with the duct flanges and effectuating a tight seal therebetween. A variety of seal assembly configurations are contemplated including those of continuous or segmented structure, those having compressible resilient materials or ductile metals as sealing materials, and those having a support band bonded to the sealing material for added structural rigidity. (Author)

11B. Ceramics, Refractories, and Glasses

AD-A080 071/4 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Materials
Structure and Properties of Glasses.
Final rept. 1 Oct 78-30 Sep 79,
John D. Mackenzie. Nov 79, 12p AFOSR-TR-80-0053
Grant AFOSR-79-0019

The elastic modulus of glasses are shown to be affected by ion-exchange because of the loss of unoccupied space in the glass network. The water content of berylliium fluoride glasses affects the ionic content although the fluorine ion is the current carrier because of defects in the glass caused by water. Transparent composites have been prepared by impregnating porous glass with polymethylmethacrylate. (Author)

PATENT-4 148 663 Not available NTIS
Department of Energy, Washington, DC.
Refractory Concretes.
Patent,
C. E. Holcombe, Jr. Filed 21 Jun 77, patented 10 Apr 79, 12p PAT-APPL-808 486
Supersedes PAT-APPL-808 486-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Novel concrete compositions comprise particles of aggregate material embedded in a cement matrix, said cement matrix produced by contacting an oxide selected from the group of Y sub 2 O sub 3 , La sub 2 O sub 3 , Nd sub 2 O sub 3 , Sm sub 2 O sub 3 , Eu sub 2 O sub 3 and Gd sub 2 O sub 3 with an aqueous solution of a salt selected from the group of NH sub 4 HO sub 3 , NH sub 4 Cl, YCl sub 3 and Mg(NO sub 3) sub 2 to form a fluid mixture; and allowing the fluid mixture to harden. (ERA citation 05:007421)

PATENT-4 184 884 Not available NTIS
Department of the Interior, Washington, DC.
Process for Producing a Metastable Precursor Powder and for Producing Sialon from this Powder.
Patent,
Bing W. Jong. Filed 23 Oct 78, patented 22 Jan 80, 7p PB80-139249, PAT-APPL-953 393
Supersedes PB-292 208.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

There is disclosed a process for producing a metastable precursor powder having about 20 to 60 percent of the silicon thereof in the nitride form. This process includes a controlled nitriding step using silicon, alumina, and either aluminum or aluminum nitride as starting materials. There is also disclosed a process for producing sialon from this precursor powder. This process includes the steps of doping the precursor powder, cold pressing or slip casting the doped powder, and then carrying out a controlled sintering step under a nitrogen atmosphere.

PB80-134620 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Metallurgy Research Center.
Cristobalite in Fire Clay Calcines.
Rept. of investigations 1979,
C. B. Davison, and H. Heystek. 1979, 22p
BUMINES-RI-8394

One goal of the Bureau of Mines is to conserve the Nation's mineral resources by developing improved performance materials. Consistent with this goal, the Bureau conducted studies on the formation of undesirable cristobalite in seven different fire clays used as refractories. The studies employed scanning electron micrography, chemical and X-ray analyses, and pyrometric cone equivalent determinations to examine the sample clays and determine the effect of thermal history and stabilizing additives on the amount of cristobalite in various calcines.

PB80-805864 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnesium Oxide Ceramics and Refractories (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
William E. Reed. Mar 80, 262p
Supersedes NTIS/PS-79/0217, NTIS/PS-78/0248, and NTIS/PS-77/0207. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0214, NTIS/PS-79/0218, and PB80-805872.

Federally-funded research is cited on the structure, deformation, mechanical properties, fabrication, radiation effects, tests, and thermodynamic properties. Studies on phase diagrams, diffusion, and electrical, high temperature, and nuclear reactor applications are also presented. (This updated bibliography contains 255 abstracts, 20 of which are new entries to the previous edition.)

PB80-805872 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnesium Oxide Ceramics and Refractories. Volume 3. 1978-January, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-Jan 80,
William E. Reed. Mar 80, 156p
Supersedes NTIS/PS-79/0219, NTIS/PS-78/0249, and NTIS/PS-77/0208. For the companion Published Search of the NTIS Data Base, see PB80-805864. See also Volume 1, 1971-1973, NTIS/PS-76/0214 and Volume 2, 1974-1977, NTIS/PS-79/0218.

Worldwide research is cited on sintering, structure, mechanical properties, strength, degradation, phase studies, additives, and uses of these materials. (This updated bibliography contains 149 abstracts, 67 of which are new entries to the previous edition.)

11C. Coating, Colorants, and Finishes

AD-A079 547/6 PC **A03**/MF **A01**
Rock Island Arsenal IL Engineering Directorate
A Dual Vessel System of Phosphating Ferrous Alloys under Steam Pressure.
Technical rept.,
Henry Crain, and Linden H. Wagner. Aug 79, 34p
Rept no. SARRI-EN-79-03

A dual vessel system of phosphating ferrous alloys under steam pressure was investigated for the application of high temperature corrosion resistant coatings on a continuous production-type basis. In this system, the phosphating bath can be transferred from one vessel to another using differential steam pressure. Either vessel can be used as a phosphating or holding tank and the bath can be maintained continuously under pressure. Sludge

can be removed from the bath during the transfer of solution to the other vessel, and the bath can be used continuously on a production-type basis. Four types of manganese enriched baths were used in testing the dual vessel system. Salt spray corrosion testing was divided into two groups: unheated panels and panels heated to 450 F for one hour. Results from the manganese tartrate enriched bath best illustrated the success of pressure phosphating using consecutive production-type runs in the dual vessel system. For this manganese tartrate bath, 90% of the heated and 81% of the unheated sets of panels passed a minimum 100-hour salt spray resistance test. Continuous control of free (to less than 3.5 points) and total acid (to above 30 points) values and proper maintenance of the bath with chemical additions after each processing period are needed for reproducible superior heat and corrosion resistant phosphate coatings.

AD-A079 781/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Black Acid-Resistant Varnish BT-783.
1 Aug 79, 10p Rept no. FTD-ID(RS)T-0920-79
Edited trans. of Russian State Standard GOST 1347-67 p1-4, n.d., by John S. Fisher.

No abstract available.

AD-A079 784/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Paint and Varnish Materials. A Method of Determining the Ultimate Tensile Strength, Relative Elongation at Rupture, and Modulus of Elasticity.
23 Aug 79, 13p Rept no. FTD-ID(RS)T-1010-79
Edited trans. of Russian State Standard GOST 18299-72 p1-7, n.d., by John S. Fisher.

No abstract available.

AD-A079 934/6 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Lacquers and Paints. Method for Determining Weather-Resistance of Coatings.
2 Jul 79, 28p Rept no. FTD-ID(RS)T-0905-79
Trans. of Russian State Standard GOST 6992-68 p1-20, by Joseph E. Pearson.

No abstract available.

AD-A079 965/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Insulating Impregnating Varnish GF-95.
6 Aug 79, 10p Rept no. FTD-ID(RS)T-0903-79
Edited trans. of Russian State Standard GOST 8018-70 p1-4, by Randy Dorsey.

No abstract available.

AD-A079 970/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Insulating Varnish KF-965.
16 Aug 79, 11p Rept no. FTD-ID(RS)T-1000-79
Edited trans. of Russian State Standard GOST n15030-69 p1-4, by Marilyn Olaechea.

No abstract available.

AD-A079 971/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Insulating Varnish AD-93.
16 Aug 79, 12p Rept no. FTD-ID(RS)T-1002-79
Edited trans. of Russian State Standard GOST n14194-69 p1-5, by Marilyn Olaechea.

No abstract available.

PB80-137078 PC **A05**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Field Evaluation of Lead Paint Hazard Abatement Methods in Boston, Massachusetts.
Lee A. Gaylor. Aug 79, 86p HUD-0000948, HUD/PDR-464
Contract HUD-H-2208

To aid in finding possible solutions to the problem of lead paint poisoning among young children, HUD implemented the Experimental Hazard Elimination Program (EHEP) to demonstrate the conventional materials for abating lead paint hazards. This report describes Phase II of EHEP in Boston, Mass., involving the abatement of lead paint hazards in 72 dwelling units under 24 contracts and subcontracts. Phase I, consisting of two of the three demonstrations, took place in Washington, D.C., and Atlanta, Ga. After reviewing Phase I plans, HUD eliminated requirements of specific ages and types of dwelling units from the dwelling unit sampling plan and added a requirement for the use of occupied as well as unoccupied dwelling units. The methods of screening and selecting dwelling units also were changed. Boeing Aerospace Company was responsible for the lead paint detection survey inspection, selection of candidate dwelling units (multifamily, low - rise, HUD - acquired properties), assignment of abatement techniques, and carrying out the lead hazard abatement operation. Six wall covering materials and four paint removal techniques, demonstrated in this operation, are described. Although all abatement techniques used were acceptable for the housing in Boston, some of the methods were not suitable for all of the substrate conditions found in housing units. For instance, only rigid board materials (gypsum wall board, prefinished plywood) are suitable for both sound and unsound substrates. Further analyses of these data are provided to assist HUD, local authorities, and private homeowners in determining the most advantageous approach to eliminating lead paint hazards. Technical material specifications and the implementation characteristic rating sheet are appended. Supporting tabular data, charts, and definitions of terms are provided.

PB80-140742 PC **A02**/MF **A01**
Louisiana Dept. of Transportation and Development, Baton Rouge. Research and Development Section.
Evaluation of Interior and Exterior Latex Paints.
Final rept. 1972-79
David G. Azar, and W. E. Graves. 31 Oct 79, 25p FHWA/LA-79-132

An extensive search for durable latex paints was conducted. Exposure tests of twenty-four latex paints on concrete and wood were made; however, only twenty-three panels were recovered due to weather conditions. A final rating has been made on the basis of general appearance.

11D. Composite Materials

AD-A079 557/5 PC **A03**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Prediction and Verification of Moisture Effects on Carbon Fiber-Epoxy Composites.
Progress rept. Oct 77-Oct 78,
Joseph M. Augl. 30 Mar 79, 44p Rept no. NSWC/TR-79-43

Moisture has an effect on the elastic as well as on the strength properties of composites. In this work we have experimentally verified the prediction of changes in the longitudinal shear modules G sub 12 as a function of moisture uptake and temperature. The properties of the bulk resin (measured independently as a function of temperature and moisture concentration) were used for predicting the composite response by using the simple Halpin-Tsai equation of micromechanics. The excellent agreement between the predicted and observed values demonstrates the feasibility of predicting changes in 'reversible properties' of composite in a natural service environment as suggested in a previous report. This predictive scheme considered simultaneously the concepts of diffusion, environmental modeling, micromechanics, and a finite difference laminate theory. (Author)

AD-A079 662/3 PC **A04**/MF **A01**
Cambridge Univ (England) Dept of Engineering
Micromechanisms of Fracture of Fibrous Composites in Monotonic Loading.
Interim rept. 1 Aug 78-31 Jul 79,
Peter W. R. Beaumont, and Paul D. Anstice.
1979, 59p CUED/C-MAT/TR.54-1979, AFOSR-TR-79-1314
Grant AFOSR-78-3644

Carbon fibers and glass fibers in brittle matrics fracture by a number of distinguishable mechanisms, matrix cracking, failure of the fiber-matrix bond, fiber fracture, fiber pull-out, and so forth. A large amount of data of fiber debond length and fiber pull-out length have been collected and summarized in cumulative probability diagrams which show the distribution of extreme values. Models of fracture, together with the fracture data are used to construct fracture energy diagrams which show the origins of toughness and the dominate mechanism of failure. Failure analyses have been carried out on glass fibers and carbon fibers in epoxy and polyester resins, and on hybrid composites. Certain generalisations about fracture behavior can be drawn from comparisons of the cumulative probability and fracture energy diagrams. (Author)

AD-A079 698/7 PC **A08**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Investigation of in Situ Composites for Electromagnetic Device Applications; with Emphasis on Development of Microwave Tube Cathodes and High Resolution Displays.
Final technical rept. Jan 76-Nov 78,
John W. Goodrum. Sep 79, 171p EES/GIT-A-1815, RADC-TR-79-174
Contract F19628-76-C-0153

This report documents the results of a study to evaluate the potential of eutectic composite materials for use in electronic, optical and other devices. The composite materials may be a combination of metal-metal, metal-semiconductor, semiconductor-semiconductor, semiconductor-insulator, or insulator-insulator classes of materials. Device concepts, based on eutectic composites, were given preliminary technical and economic evaluation; brief descriptions of promising deveices are listed. Eutectic-based cold cathode and display devices were evaluated by experiments to determine the performance of a prototype cathode device and to determine the design requirements for fabrication of a diode-type display. (Author)

AD-A079 850/4 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Analytical/Experimental Investigation of the Instability of Composite Cylindrical Panels.
Master's thesis,
Marvin L. Becker. Dec 79, 89p Rept no. AFIT/GAE/AA/79D-3

An analytical and experimental program was conducted to study the instability of 8-ply laminated cylindrical panels (graphite-epoxy) subjected to an axial compressive loading. The analysis included three different ply orientations, five different boundary conditions on the vertical edges, and three different panel sizes. The analytical buckling loads were obtained by using the linear bifurcation branch of the STAGS-C computer code, and several nonlinear collapse analyses were also made on selected configurations. The experimental tests were conducted by the Air Force Flight Dynamics Laboratory using a specially deigned test fixture. Relatively good agreement was obtained between the analytical and experimental buckling loads, particularly when the nonlinear collapse load was used. The linear bifurcation results were 11 - 28% higher than the nonlinear results, indicating that the nonlinear effects in circular composite panels are important. The boundary conditions (especially w and v) had the greatest influence on the buckling load, followed by the aspect ratio and finally the ply orientation. The (+ or - 45)2s panels exhibited an unusually large increase in the buckling load when the aspect ratio was small and the in-plane displacements were restrained at the edges. (Author)

AD-A079 925/4 PC **A04**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Strengthening of Metals by Means of Fibers. Chapter 6 and 7,
V. S. Ivanova, and I. M. Kop'yev. 3 Apr 79, 73p Rept no. FTD-ID(RS)T-0224-79
Edited trans. of Uprochneniye Metallov Voloknami (USSR) p167-204 1973, by John Mose.

No abstract available.

AD-A080 023/5 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN

Aerothermal Evaluation of High-Temperature Structural Materials for use in High-Performance Missile Design.
Final rept.,
J. O. Ievalts, and R. K. Matthews. Jan 80, 46p
Rept no. AEDC-TR-79-38
Prepared in cooperation with ARO, Inc., Tullahoma, TN. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

A materials screening test was conducted in the von Karman Gas Dynamics Facility Wind Tunnel C to determine the performance of several high-temperature, polymeric and metallic composite materials being considered for use as missile structural components. Test conditions were representative of the aerothermal environment encountered during the projected flight of a high-performance, short-range air-to-air missile (SRAAM). (Author)

AD-B006 906/2 PC **A06**/MF **A01**
General Dynamics/Fort Worth Tex Fort Worth Div
Life Assurance of Composite Structures. Volume I. Moisture Effects.
Final rept. Jul 73-Feb 74,
E. L. McKague, J. D. Reynolds, and J. E. Halkias. May 75, 101p AFML-TR-75-51-Vol-1
Contract F33615-73-C-5104
Errata sheet inserted. DDC form 55 not necessary for document request.
Distribution limitation now removed.

This Volume describes tests that were conducted to determine rates and extent of moisture absorption by graphite-epoxy composites. Procedures were developed for accelerating moisture exposures so that years of environmental service could be simulated within a few months. An empirical math model was developed which can predict moisture absorption behavior under realistic or accelerated exposure conditions. Tests also were conducted to determine whether aircraft flight conditions cause changes in moisture absorption behavior. These investigations show that graphite-epoxy composites absorb moisture until an equilibrium level is reached which is proportional to relative humidity. Simulated flight conditions do not cause significant drying of the laminates. In fact, brief exposures (4-5 minutes) to supersonic heating temperatures cause significant increases in the amount and rate of subsequent moisture absorption. Subsonic temperatures, however, cause no detectable change in diffusion behavior. (Author)

AD-B014 689/4 PC **A06**/MF **A01**
Whittaker Corp San Diego Calif Research and Development Div
Development of Improved Environmental Resistant Organic-Reinforced Materials Systems.
Final rept. 1 Jun 74-31 Aug 75,
Milan G. Maximovich. Nov 75, 124p WRD-MJO-7226, WRD-MJO-3047, AFML-TR-75-181
Contract F33615-74-C-5142
DDC form 55 not necessary for document request. Distribution limitation now removed.

Commercially available matrix resins were identified and a list of resin criteria along with target goals for properties and performance was established. A screening program consisting of dimensional change measurements, water pickup determinations, and TMA curves before and after 24-hour boil was run on a series of castings and/or moldings prepared from the various candidate resins. Several systems emerged which exhibited moisture resistance superior to that of commercially available epoxy systems. Process and cure studies were carried out on glass reinforced laminates which also exhibited excellent moisture resistance. Prepreg parameter and compatibility studies along with tape and laminate fabrication and testing were carried out on the most promising candidate systems. Severe difficulties were finally encountered in achieving both high quality laminates and adequate performance at elevated temperature. The difficulties were identified and alternate means of overcoming these problems were suggested. (Author)

N80-16100/3 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Novel Approaches for Alleviation of Electrical Hazards of Graphite-Fiber Composites.
K. Ramohalli. 15 Oct 79, 47p NASA-CR-162683, JPL-PUB-79-63
Contract NAS7-100

Four basically different approaches were considered: gasification of fibers, retention in the matrix, clumping to prevent entrainment, and electrical insulation of fibers. The techniques used to achieve them are described in some detail. These involved surface treatment of fibers to improve the wettability of fibers and coating the fibers with the selected substances before laying them up for composite fabrication. Thermogravimetric analyses were performed on the plain and treated fibers in inert (nitrogen, argon) and reactive (air) atmospheres. The treated fibers embedded in epoxy were ignited in a Bunsen flame to determine the efficiency of these treatments. A simple apparatus was assembled to detect the time for the first short circuit (in a typical electrical circuit) when exposed to the combustion products from a graphite fiber composite fire. The state-of-the-art and treated fibers cast in typical epoxy were burned and ranked for potential success. It was inferred that the gasification schemes appear promising when reduction or oxidation is tried. It was also found that some very promising candidates were available for the clumping and for the electrical insulation of fibers.

N80-16101/1 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Composite Materials Research and Education Program: The NASA-Virginia Tech Composites Program.
Final Report.
C. T. Herakovich. Feb 80, 18p NASA-CR-162719
Contract NGR-47-004-129

Major areas of study include: (1) edge effects in finite width laminated composites subjected to mechanical, thermal and hygroscopic loading with temperature dependent material properties and the influence of edge effects on the initiation of failure; (2) shear and compression testing of composite materials at room and elevated temperatures; (3) optical techniques for precise measurement of coefficients of thermal expansion of composites; (4) models for the nonlinear behavior of composites including material nonlinearity and damage accumulation and verification of the models under biaxial loading; (5) compressive failure of graphite/epoxy plates with circular holes and the buckling of composite cylinders under combined compression and torsion; (6) nonlinear mechanical properties of borsic/aluminum, graphite/polyimide and boron/aluminum; (7) the strength characteristics of spliced sandwich panels; and (8) curved graphite/epoxy panels subjected to internal pressure.

N80-16102/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Fracture Modes of High Modulus Graphite/Epoxy Angleplied Laminates Subjected to off-Axis Tensile Loads.
J. H. Sinclair. 1980, 22p NASA-TM-81405, E-319
Conf-Presented at 35TH Ann. Conf. Of the Reinforced Plastics/Composites Inst., New Orleans, 4-8 Feb. 1980; Sponsored by Soc. Of Plastics Ind.

Angelplied laminates of high modulus graphite fiber/epoxy were studied in several ply configurations at various tensile loading angles to the zero ply direction in order to determine the effects of ply orientations on tensile properties, fracture modes, and fracture surface characteristics of the various plies. It was found that fracture modes in the plies of angleplied laminates can be characterized by scanning electron microscope observation. The characteristics for a given fracture mode are similar to those for the same fracture mode in unidirectional specimens. However, no simple load angle range can be associated with a given fracture mode.

N80-16103/7 PC **A03**/MF **A01**
North Carolina Agricultural and Technical State Univ., Greensboro. School of Engineering.
Effect of Temperature on Composite Sandwich Structures Subjected to Low Velocity Impact.
Final Report.
A. V. Sharma. Feb 80, 34p NASA-CR-162718
Grant NSG-1296

The effect of low velocity projectile impact on sandwich-type structural components was investigated. The materials used in the fabrication of the impact surface were graphite-, Kevlar-, and boron-fibers with appropriate epoxy matrices. The testing of the specimens was performed at moderately low- and high-temperatures as well as at room temperature to assess the impact-initiated strength degradation of the laminates. Eleven laminates with different stacking sequences, orientations, and thicknesses were tested. The low energy projectile impact is considered to simulate the damage caused by runway debris, the dropping of the hand tools during servicing, etc., on the secondary aircraft structures fabricated with the composite materials. The results show the preload and the impact energy combinations necessary to cause catastrophic failure in the laminates tested. A set of faired curves indicating the failure thresholds is shown separately for the tension-and compression-loaded laminates. The specific-strengths and -modulii for the various laminates tested are also given.

N80-16104/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Composite Components under Impact Load and Effects of Defects on the Loading Capacity.
R. Aoki, and D. Wurzel. Sep 79, 47p NASA-TM-75351, DGLR-78-190
Contract NASW-3199
Tran. of "Composite-Bautseileunter Schlagbelastung und Auswirkung von Defekten Auf die Belastbarkeit", Dglr-78-190 Dglr, (Germany, F.R.) 1978 48 p.

Investigations were carried out on a horizontal tail assembly mace of carbon fiber reinforced plastic for the Alpha jet. The possibility of obtaining a leading edge nose design lighter but not more expensive than a metal version was studied. An important consideration was sufficient resistance of the leading edge against impact of stones and hailstones combined with high degree of stiffness. The improvement of energy reception characteristics of the materials through suitable laminate design was considered since certain defects occur in structural components, the affects of such defects on the characteristics of the part were also studied.

N80-16105/2 PC **A13**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Manufacturing Processes for Fabricating Graphite/Pmr 15 Polyimide Structural Elements.
Contractor Report, Aug. 1977 - Feb. 1979.
C. H. Sheppard, J. T. Hoggatt, and W. A. Symonds. Feb 79, 295p NASA-CR-159129, D180-20545-2
Contract NAS1-15009

Investigations were conducted to obtain commercially available graphite/PMR-15 polyimide prepreg, develop an autoclave manufacturing process, and demonstrate the process by manufacturing structural elements. Controls were established on polymer, prepreg, composite fabrication, and quality assurance, Successful material quality control and processes were demonstrated by fabricating major structural elements including flat laminates, hat sections, I beam sections, honeycomb sandwich structures, and molded graphite reinforced fittings. Successful fabrication of structural elements and simulated section of the space shuttle aft body flap shows that the graphite/PMR-15 polyimide system and the developed processes are ready for further evaluation in flight test hardware.

N80-16106/0 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor.
Increased Fracture Toughness of Graphite-Epoxy Composites Through Intermittent Interlaminar Bonding.
Final Report, Nov. 1978 - Oct. 1979.
D. K. Felbeck, and L. C. Jea. Jan 80, 36p NASA-CR-159198
Contract NGR-23-005-528

Intermittent interlaminar bonding, which can lead to a large increase in the fracture surface area, was achieved through the introduction of thin perforated Mylar between the layers of a multi-layer continuous-filament graphite-epoxy composite.

For the best optimum condition included in this study, fracture toughness was increased from about 100 kJ/sq m for untreated specimens to an average of about 500 kJ/sq m, while tensile strength dropped from 500 MPa to 400 MPa, and elastic modulus remained the same at about 75 GPa. An approximate analysis is presented to explain the observed improvement in toughness.

N80-16107/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Prediction of Fiber Composite Mechanical Behavior Made Simple.
C. C. Chamis. 1980, 26p NASA-TM-81404, E-331
Conf-Presented at the 35TH Ann. Conf. Of the Reinforced Plastics/Composites Inst., New Orleans, 4-8 Feb. 1980; Sponsored by the Soc. Of Plastics Ind.

The elastic properties and failure stresses of angleplied fiber composite laminates were determined using a pocket calculator. The procedure uses simple equations and appropriate graphs of elastic properties versus angle plies, and can handle all types of fiber composites including hybrids. The versatility and generality of the method is illustrated in several step-by-step numerical examples.

11E. Fibers and Textiles

AD-A079 940/3 PC **A06**/MF **A01**
Andrulis Research Corp Bethesda MD
A Study of Agent-Reactive Fabrics for Use in Protective Clothing.
Final rept. May 78-Jul 79,
Gerald Zon. Dec 79, 114p ARC/LS/TR-0060-2, ARCSL-CR-80002, AD-E410 219
Contract DAAK11-78-C-0060

A broad investigation has been carried out in order to obtain modified fabrics which exhibit catalytic activity toward hydrolytic decomposition of chemical warfare agents. The major areas of study included the development of chemically modified Nomex and cotton-blend fabrics, mechanistic inquiries with regard to factors which control simulant/agent hydrolysis, and the design and construction of a suitable fabric testing apparatus for comparative evaluation of candidate fabrics. (Author)

11F. Metallurgy and Metallography

AD-A079 538/5 PC **A09**/MF **A01**
Rutgers - the State Univ Piscataway NJ Coll of Engineering
Determination of Prefracture Fatigue Damage.
Research and development rept.,
Robert Pangborn, Sigmund Weissmann, and Irvin R. Kramer. Jan 80, 186p DTNSRDC-80/006
Contract N00600-77-C-1134

X-ray double crystal diffractometry and reflection topography were employed to examine the deformation response of single crystals and Al 2024 alloy specimens. A propensity for preferential work hardening of the surface layers compared to the bulk material was demonstrated for both tensile-deformed and fatigue-cycled metals. The cyclically induced defect distribution with depth from the specimen surface was also investigated as a function of the fraction of fatigue life. This led to a capability for predicting the fatigue life by a nondestructive x-ray diffraction method. Single crystals of silicon and aluminum pulled in tension exhibited a highly fragmented 'debris' layer, extending to about 100 microns in depth, and a core region featuring a much lower excess dislocation density and considerably less lattice breakup and misorientation. A similar decreasing gradient in the excess dislocation density from the surface to the bulk material was obtained for plastically deformed gold monocrystals for which no oxide layer is formed. Aluminum monocrystals cycled in the push-pull fatigue mode revealed a work-hardened surface layer and a transitional subsurface region between the surface layer and the core material. At sufficiently low stress amplitudes, no cyclic damage was introduced in the bulk despite the rapid generation and interaction of dislocations in the surface layer.

AD-A079 806/6 PC **A04**/MF **A01**
Mcdonnell Douglas Research Labs St Louis MO
Influence of Rare-Earth Additions on Properties of Titanium Alloys. Plane-Strain Fracture Toughness, Creep, and High-Temperature Deformation of Ti-6Al-4V with Erbium and Yttrium Additions.
Technical rept. 1 Apr 78-31 Mar 79,
Shankar M. L. Sastry, Richard J. Lederich, Peter S. Pao, and James E. O'Neal. 31 May 79, 70p
Rept no. MDC-Q0684
Contract N00014-76-C-0626

The influence of additions of 0.05 wt% Y and 0.1 wt% Er on the room-temperature tensile properties, plane-strain and plane-stress fracture toughness, creep, and high-temperature high-strain-rate deformation characteristics of Ti-6Al-4V was studied. 75kg ingots of Ti-6Al-4V, Ti-6Al-4V-0.05Y and Ti-6Al-4V-0.1Er were cast, forged, and rolled into 80-mm, 30-mm, and 13-mm plates. The Y and Er additions reduce the high-temperature flow stress of Ti-6Al-4V at strain rates of 0.05 and 0.5/s and significantly improve ingot-breakdown forging by suppressing the edge cracking. The Y-containing Ti-6Al-4V has lower flow stress and higher strain-rate sensitivity of flow stress and consequently better superplasticity than the reference alloy at 906 C at strain rates of .00001 to .001/s. The room-temperature plane-strain fracture toughness, yield stress, ductility, and high-temperature creep are not significantly altered by the rare-earth additions. (Author)

AD-A079 813/2 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Fracture and Fatigue Research Lab
Quantitative Fractography of a Fatigued Ti-28 w/o V Alloy.
Technical rept.,
Ervin E. Underwood, and Saghana B. Chakrabortty. 27 Nov 79, 34p Rept no. GIT-TR-79-1
Contract N00014-75-C-0349

A quantitative fractographic analysis was undertaken to study the microstructural features important in the understanding of the mechanisms of fatigue crack growth and in the prediction of fatigue crack propagation rates. Special emphasis in this work is placed on the facet characteristics and sub-surface cracking. The stereological treatment of this problem develops methodologies and relationships based primarily on vertical sections through the fracture surface and parallel to the crack propagation direction. The evaluation of fracture profiles (in terms of true length, roughness, and degree of orientation) permits calculation of fracture surface characteristics (such as true surface area, roughness, and type of surface--the latter through an upper-lower bound approach). (Author)

AD-A079 950/2 PC **A02**/MF **A01**
Materials Research Labs Ascot Vale (Australia)
Corrosion in the Australian Defence Scene. 1. The Army and Anciliary Equipment for the RAAF,
Jeffrey J. Batten. Aug 79, 25p Rept no. MRL-R-752
See also AD-A078 636.

Although Australia purchases much of its advanced military equipment from other TTCP countries, there are differences between Australia and these countries with respect to usage and expected life of that equipment. These differences carry with them considerable corrosion penalties. This paper describes case histories of some of the more recurrent types of corrosion problems. It is concluded that the choice of correct materials, techniques and design are essential to reduce the number of these problems. Further, the technology which would have prevented their occurrence was already in existence. Thus they mostly arose through lack of technology transfer from the corrosion scientist to the market place. (Author)

AD-A079 959/3 PC **A03**/MF **A01**
Pennsylvania Univ Philadelphia Dept of Materials Science and Engineering
On the Mechanism of Corrosion of Cu-9.4Ni-1.7Fe Alloy in Air Saturated Aqueous NaCl Solution. I. Kinetic Investigations.
Technical rept.,
C. Kato, B. G. Ateya, J. E. Castle, and H. W. Pickering. 6 Nov 79, 31p Rept no. TR-11
Contract N00014-75-C-0264
See also AD-A079 963.

The mechanism of formation of the protective layer on commercial Cu-9.4Ni-1.7Fe alloy in aerated 3.4 wt% NaCl solution at room temperature was investigated for various times up to 191 days. The weight of the sample, the weight of the corrosion product layer and the anodic and cathodic polarization curves were measured before and after the corrosion periods. Results of these experiments identify the rate limiting electrode reaction of the overall corrosion process to be oxygen reduction. They provide new insight into the kinetics of formation (parabolic) and structure of the corrosion-product layer, and they pinpoint the location of the rate-limiting oxygen reduction reaction. This location is found to be the surface of a thin, strongly adherent inner layer which is in contact with electrolyte as a result of the porous nature of the much thicker outer layer. Finally, results from specially designed experiments utilizing the electrocatalysts Pd and Pt are consistent with the view that the oxygen reduction rate is low due to a low electrocatalytic activity of the (inner) corrosion product surface for this reaction. (Author)

AD-A079 963/5 PC **A03**/MF **A01**
Pennsylvania Univ Philadelphia Dept of Materials Science and Engineering
On the Mechanism of Corrosion of Cu-9.4Ni-1.7Fe Alloy in Air Saturated Aqueous NaCl Solution. II. Composition of the Protective Surface Layer.
Technical rept.,
C. Kato, J. E. Castle, B. G. Ateya, and H. W. Pickering. 6 Nov 79, 33p Rept no. TR-12
Contract N00014-75-C-0264
See also AD-A079 959.

The formation of protective layers on Cu-9.4Ni-1.7Fe alloy in air saturated, aqueous 3.4 at % NaCl solution, both under natural corrosion and under potentiostatic conditions, have been studied by ESCA (XPS), SEM and X-ray diffraction. It was concluded that the protective film formed under open circuit corrosion conditions has the following features: (1) is comprised of a relatively thick outer layer mainly Cu2(OH)3Cl and an inner thin layer of probably Cu20 but also containing appreciable chloride and some nickel, (2) is rich in Cl throughout the film with a maximum concentration along a plane near the alloy/corrosion product interface, (3) is poor in Ni and Fe in the inner thin layer but rich in these elements further out from this region, and (4) has, in early stages of growth, an outer surface consisting of a cuprous (probably (Cu2O) compound which with time gives way to a carbonate and finally to a cupric (Cu2(OH)3Cl) compound. The maximum Cl content and the transition in Fe, Cu and Ni concentrations are rather sharply confined to the interface region between the thin inner and thick outer layers along which fracture occurs when the reaction product is stripped from the sample with tape. Thus, the fully developed protective film consists of at least two compositionally different layers which form a weak interface between them.

AD-A079 979/1 PC **A03**/MF **A01**
Electrochemical Technology Corp Seattle WA
A Study of Transport Processes and Initiation of Corrosion Under Paint Films.
Final rept. 1 Oct 76-30 Sep 79,
Theodore R. Beck, and Robert T. Ruggeri. Nov 79, 50p AFOSR-TR-80-0028
Contract F49620-76-C-0029

Combating corrosion of airplane structure is a large and increasing cost to the Air Force. Fundamental knowledge of how protective coatings function is required in order to develop improved coating systems. This research was directed to obtain quantitative knowledge of mass transport and kinetic mechanisms that result in initiation of corrosion under paint films. Mathematical modeling of transport processes and electrochemical tests on paint films were conducted concurrently. Coating systems of current use in the Air Force, polyurethane and epoxy, were examined. Experiments were conducted with detached films and with films on aircraft alloy aluminum and iron substrates.

AD-A080 084/7 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Materials Science and Engineering

Fracture at Elevated Temperature in Dispersion Strengthened Alloys.
Final technical rept. 1 Oct 75-30 Sep 79,
Rishi Raj. 3 Dec 79, 36p AFOSR-TR-80-0043
Grant AFOSR-76-2930

This report describes important new findings in the understanding of intergranular cavitation and fracture in alloys which derive their creep strength from the presence of hard second phase particles, such as the nickel base superalloys. The work is primarily theoretical but is supported in most instances, by simple experiments on model alloys. Criteria for the nucleation of cavities at high temperature are developed and it is shown that cavities are most likely to nucleate at particles in the grain boundaries.

AD-A080 088/8 PC **A04**/MF **A01**
Pratt and Whitney Aircraft Group East Hartford CT
Deformation and Fracture of Advanced Anisotropic Superalloys.
Final technical rept. 1 Oct 75-30 Sep 79,
Anthony F. Giamei. Nov 79, 67p PWA-FP-12637, AFOSR-TR-80-0033
Contract F44620-76-C-0028

The modern single crystal superalloy baseline of Ni-5A1-2Ti-1Nb-9Cr-12W (by weight) was selected (PWA 1444). The Re/W ratio was varied from 0.0 to 1.0 as the Re + W was held constant at 12 wt %. Single crystals were grown with axial orientations of <001>, <110>, and <111> from four different alloys and were fully heat treated (gamma prime solution + age). An additional alloy was made at 4Ta/4W/4Re in the three high symmetry orientations. Test specimens of the compressive and tensile creep/rupture design were obtained by sectioning or electrochemical machining. Creep data were obtained in tension and compression with temperature/stress combinations of 816 C/650 Mpa, 899 C/380 MPa, 982 C/220 MPa and 1066 C/138 MPa (1500 F/94 ksi, 1650 F/55 ksi, 1800 F/32 ksi and 1950 F/20 ksi). Crystals were characterized by chemical analysis, optical metallography and crystallographic orientation determination by the Laue method. Aging studies were carried out at 816 C (1500 F), 899 C (1650 F), 982 C (1800 F) and 1066 C (1950 F). The Re content was found to systematically and substantially refine the gamma prime particle size. Transmission electron microscopy was carried out after 0.20% creep strain at 899 C (1650 F). The primary slip system was consistently (111) <110> for <001> and <110> oriented specimens but (100) <110> slip was found for the <111> oriented tensile and compressive samples at 0% Re. Higher Re levels showed a lesser tendency for cube slip. The Re addition substantially strengthens all three orientation tested, particularly <111>.

N80-16141/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Scanning-Electron-Microscope Study of Normal-Impingement Erosion of Ductile Metals.
W. A. Brainard, and J. Salik. Jan 80, 11p NASA-TP-1609, E-085

Scanning electron microscopy was used to characterize the erosion of annealed copper and aluminum surfaces produced by both single- and multiple-particle impacts. Macroscopic 3.2 mm diameter steel balls and microscopic, brittle erodant particles were projected by a gas gun system so as to impact at normal incidence at speeds up to 140 m/sec. During the impacts by the brittle erodant particles, at lower speeds the erosion behavior was similar to that observed for the larger steel balls. At higher velocities, particle fragmentation and the subsequent cutting by the radial wash of debris created a marked change in the erosion mechanism.

N80-16142/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Stress Corrosion Cracking Evaluation of Martensitic Precipitation Hardening Stainless Steels.
T. S. Humphries, and E. E. Nelson. Jan 80, 34p NASA-TM-78257

The resistance of the martensitic precipitation hardening stainless steels PH13-8Mo, 15-5PH, and 17-4PH to stress corrosion cracking was investigated. Round tensile and c-ring type specimens taken from several heats of the three alloys were stressed up to 100 percent of their yield strengths and exposed to alternate immersion in salt water, to salt spray, and to a seacoast environment. The results indicate that 15-5PH is highly resistant to stress corrosion cracking in conditions H1000 and H1050 and is moderately resistant in condition H900. The stress corrosion cracking resistance of PH13-8Mo and 17-4PH stainless steels in conditions H1000 and H1050 was sensitive to mill heats and ranged from low to high among the several heats included in the tests. Based on a comparison with data from seacoast environmental tests, it is apparent that alternate immersion in 3.5 percent salt water is not a suitable medium for accelerated stress corrosion testing of these pH stainless steels.

PAT-APPL-6-072 955 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Electrodeposition of Lead.
Patent Application,
Ernest R. Cole, Jr., Agnes Y. Lee, and Danton L. Paulson. Filed 6 Sep 79, 6p PB80-139470
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Electrowinning or electrorefining of lead is accomplished by electrodeposition of the lead on a copper cathode. Recovery of the deposited lead from the cathode is accomplished by immersion in molten lead.

PAT-APPL-6-072 956 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Electrolytic Stripping Cell.
Patent Application,
Beverly W. Dunning, Jr., and Harry D. Chambers. Filed 6 Sep 79, 12p PB80-139462
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrolytic stripping cell is provided which is particularly adapted for use in processing shredded, silver brazed, stainless steel honeycomb scrap. The cell comprises a mesh anode basket which rotates within a cathode cylinder to provide partial stirring of the cell electrolyte. The anode basket includes a central hollow shaft having holes therein through which the electrolyte continually circulates. The basket includes wiper blades for dislodging silver dentrites which grow between the anode and cathode and which, as they fall, are collected in a mesh basket located at the bottom of the cell housing.

PB80-133903 PC **A02**/MF **A01**
Nebraska Water Resources Center, Lincoln.
Application of Linear Polarization Techniques to the Study of Carbon Steel Corrosion in Dilute Ammonium Nitrate Solutions and Irrigation Groundwaters.
Project completion rept. 1 Oct 76-30 Sep 79,
Donald L. Johnson. 1 Sep 79, 24p W80-02709, OWRT-A-046-NEB(1)

Linear polarization measurements were used to predict corrosion rates for low carbon 1018 steel, a material commonly used in irrigation structures and electrical components. Corrosivity was determined as a function of ammonium nitrate which is commonly distributed to fields through irrigation systems. Both dilute ammonium nitrate solutions and corrosive groundwater field samples from wells in central Nebraska were tested. No ammonium nitrate was added to the field samples. Dual potentiostat systems, a PAR system with a Corning test cell for anodic polarization and an Aardvark system with a modified test cell for linear polarization were used. Corrosion rate data were based on 1018 steel weight change as a function of time and ammonium nitrate concentration.

PB80-133937 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Metallurgy Research Center.
Incinerated Municipal Sewage Sludge as a Potential Secondary Resource for Metals and Phosphorus.
Rept. of investigations,
Robert C. Gabler, Jr. 1979, 29p BUMINES-RI-8390

Evaluation of incinerated sewage sludge as a secondary resource for aluminum, phosphorus, and minor constituents such as copper and zinc was initiated as part of the Bureau of Mines secondary resource program. The elemental composition of sludge ash for 14 plants in 11 U.S. cities was determined. Comparing industrialized cities with cities where most of the sewage is domestic, significant differences in heavy metal content was noted. Various parameters were investigated affecting the extraction of metals and phosphorus from a typical industrial city sludge ash and from a Palo Alto, Calif., sludge ash with a high precious metal content. Three extraction-recovery procedures for metals and phosphorus using sulfuric acid leaching, ion exchange, and various precipitation techniques were investigated. The last procedure developed was a combination approach using a three-stage countercurrent sulfuric acid leach that recovered most of the economic values from the sludge ash and also removed the leachable fraction of elements of environmental concern.

PB80-133994 PC **A02**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Metallurgy Research Center.
Detinning Ferrous Products from Urban Waste for Use in Steelmaking.
Rept. of investigations 1979,
H. V. Makar, B. J. Wiegard, Jr, and E. L. Gresh III. 1979, 20p BUMINES-RI-8404

Ferrous fractions recovered from urban refuse were tested to assess their character, composition, and response to detinning. Results from laboratory and pilot tests established the technical feasibility of detinning scrap recovered from household refuse. Detinned products containing less than 0.03 percent residual tin were produced. Concentrations of other residual elements were determined and compared with those in existing commercial scrap and with proposed specifications. Studies were extended to include evaluations under commercial conditions. Based on these studies, full-scale commercial demonstrations showed that detinned bales equivalent to No. 1 bundle quality could be produced in carload quantities. Up to 5 pounds of tin per gross ton of scrap is concurrently recovered during the detinning process.

PB80-134844 PC **A02**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Metallurgy Research Center.
Extraction of Uranium from Carbonaceous Sandstone Materials.
Rept. of investigations 1979,
I. L. Nichols, A. G. Lawrence, and D. C. Seidel. 1979, 21p BUMINES-RI-8393

Laboratory characterization studies have investigated the processing variability of carbonaceous uranium-bearing materials found in sandstone deposits. Ore samples from New Mexico, Texas, and Wyoming were examined, and each responded differently. Using direct acid leaching techniques, some of the ores required acid additions of only 50 pounds per ton, wile others required 300 pounds per ton of material. Maximum extractions ranged from 83 to 94 percent in the six ores tested. Roasting those ores prior to leaching improved extraction of the uranium to the 90 to 99 percent range. An oxidative autoclave treatment used with five of these ores resulted in extraction of 78 to 97 percent of the uranium. The experimental studies also showed that some carbonaceous materials can be concentrated by froth flotation. The flotation tailings were amenable to acid leaching, and up to 98 percent of the uranium was extracted from this type of material.

PB80-135114 PC **A02**/MF **A01**
Bureau of Mines, Rolla, MO. Rolla Metallurgy Research Center.
Electrorefining Missouri Low-Antimony Lead Bullion.
Rept. of investigations,
A. Y. Lee, E. R. Cole, Jr., and D. L. Paulson. 1979, 20p BUMINES-RI-8401

The report describes a Bureau of Mines investigation of an electrolytic procedure for refining Mis-

souri lead bullion. The procedure is more energy efficient and environmentally acceptable than conventional pyroprocessing. By adding 1 pct Sb to the lead bullion anodes for stabilizing anode slimes during electrolysis, or using anode bags to collect loose slimes formed on anodes without added Sb, the resulting electrorefined products analyzed 99.999 and 99.99 pct Pb, respectively. Energy consumption was low--70 to 90 kwhr per metric ton of refined lead, and the current efficiency was near 100 pct. Electrorefining was conducted in laboratory cells containing lead fluosilicate electrolyte with aloes and calcium lignin sulfonate as additives. A current density of 170 A/sq m and a cell temperature of 40C was determined to be most advantageous during 24- and 72-hour tests.

PB80-138456 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Diffusion of Zirconium and Tin in a beta-Zirconium-Tin Alloy(Diffuziya Tsirkoniya i Olova V Olovyanistykh Splavakh beta-Tsirkoniya),
G. B. Fedorov, and V. D. Gulyakin. 1979, 11p TT-79-58097B, DMDC-40003B
Trans. of Metallurgiya i Metallovedenie Chistykh Metallov (USSR) n1 p170-177 1959, by V. S. Emelferov. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The self-diffusion of radioactive Sn and Zr in pure Zr and Zr-Sn alloys (containing 0.7%Sn, 3.25%Sn, and 5.6%Sn, all by weight) were measured in the temperature range 900 to 1250C. The experimental technique employed was Gruzin's residual activity measurement method. Arrhenius plots were developed and Arrhenius relations determined. Results for these alloys were compared to similar measurements made in Ni, Fe, Co, Mo, and their alloys.

PB80-138787 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Self-Diffusion of Molybdenum and Diffusion of Tungsten in Molybdenum (Samodiffuziya Molibdena i Diffuziya Vol'frama V Molibdene),
E.V. Borisov, P. L. Gruzin, L. V. Pavlinov, and G. B. Fedorov. 1979, 9p TT-79-58097C, DMDC-40003C
Trans. of Metallurgiya i Metallovedenie Chistykh Metallov (USSR) n1 p213-223 1959, by V. S. Emelferov. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

These experiments were performed in the internal 1800 to 2175C. Radioactive isotopes of Mo and W were employed and Gruzin's method of measuring residual activity was the technique used. Arrhenius plots give the temperature dependence of diffusion and diffusion equations were determined. The results are compared with self-diffusion data for other high-melting point metals (eg., Co, Ni, etc.)

PB80-138795 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Diffusion in Heat-Resisting Alloys of Cobalt Base(Diffuziya v Zharoprochnykh Splavakh na Kobavakh na Kobal'tovoi Oshove),
P. L. Gruzin, and G. B. Fedorov. 1979, 9p TT-79-58097D, DMDC-40003D
Trans. of Metallurgiya i Metallovedenie Chistykh Metallov (USSR) n1 1959, by V. S. Emelferov. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The diffusion of radioactive Co, Cr, and W into a variety of alloys (containing principally Ni, Cr, Co, W, Mo, and minor amounts of C, Si, Mn, Fe, S, P, and Al) were measured in the temperature range of 850 to 1250C. Gruzin's method of measuring residual activity was the experimental technique used. Arrhenius plots are presented and the parameters of the diffusion equations listed. The role of carbide growth occurring in these alloys is discussed. The effect of various alloying elements (C and Mo) on the diffusion constants was also studied.

PB80-138803 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Diffusion of Zirconium and Tin in an alpha-Zirconium-Tin Alloy (Diffuziya Tsirkoniya i Olova V Olovyanistykh Splavakh alpha-Tsirkoniya),
G. B. Fedorov, and F. I. Zhomov. 1979, 10p TT-79-58097A, DMDC-40003A
Trans. of Metallurgiya Metallovedenie Chistykh Metallov (USSR) n1 p161-178 1959, by V. S. Emelferov. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The self diffusion of radioactive Sn and Zr in pure Zr and Zr-Sn alloys (containing 0.41%Sn, 1.03%Sn, and 1.97%Sn all by weight) was measured in the temperature range 300 to 863C. The Gruzin method of residual activity measurements was the experimental technique employed. Arrhenius relations were obtained from plots of log D vs 1/T. Results were compared with diffusivities of the beta-phase alloys of this alloy system and alpha-Fe, gamma-Fe, as well as pure nickel.

PB80-141070 Not available NTIS
National Bureau of Standards, Washington, DC.
Corrosion Fatigue of 316L Stainless Steel, Co-Cr-Mo Alloy, and EL1 Ti-6Al-4V.
Final rept.,
M. A. Iman, A. C. Fraker, and C. M. Gilmore. 1979, 15p
Pub. in Proceedings American Society for Testing and Materials Symp. on Corrosion and Degradation of Implant Materials, Held at Kansas City, MO on May 22-23, 1978, Amer. Soc. Test. Mater. Spec. Tech. Publ. 684, p129-143, 1979.

The purpose of this paper is to compare corrosion-fatigue properties of selected implant alloys and to discuss the corrosion fatigue-life in terms of the corrosion behavior and the metal microstructure. The tests were conducted in fully reversed torsion in flowing Hank's solution at a temperature of 37 C and a pH of 7.4. Specimens were subjected to fatigue at shear strains ranging from 0.006 to 0.018 and at a frequency of 1 Hz. Surfaces of the 0.5-cm-diameter specimens were prepared by mechanically polishing through a 0.05 alumina powder and following this with steam sterilization.

PB80-805831 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superalloys. Volume 2. 1977-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Feb 80,
William E. Reed. Mar 80, 127p
Supersedes NTIS/PS-79/0220, NTIS/PS-78/0199, and NTIS/PS-77/0160. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0107, NTIS/PS-78/0200, PB80-805849, and PB80-805856. See also Volume 1, 1964-1976, NTIS/PS-78/0198.

Federally-funded research on cobalt- and nickel-based superalloys is cited. Casting and powder metallurgy of these alloys are covered. Properties such as heat resistance, corrosion resistance, microstructure, fracture, and creep are described. The use of these materials in nuclear reactors, gas turbine parts, and high temperature equipment is a major part of this compilation. (This updated bibliography contains 120 abstracts, 45 of which are new entries to the previous edition.)

PB80-805849 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superalloys. Volume 3. March, 1977-1978 (Citations from the Engineering Index Data Base).
Rept. for Mar 77-1978,
William E. Reed. Mar 80, 272p
See also Volume 1, 1970-1973, NTIS/PS-76/0107, Volume 2, 1974-March, 1977, NTIS/PS-78/0200.

Worldwide research is cited on cobalt-, iron-, and nickel-based superalloys. The manufacture, melting, casting, powder metallurgy, forging, and welding of these alloys are covered. Studies on corrosion, high and low temperature properties, physical, and mechanical properties of these materials are included. Applications discussed are nuclear reactors, gas turbines, superconducting machinery, and heat exchangers. (This updated bibliography contains 265 abstracts, none of which are new entries to the previous edition.)

PB80-805856 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superalloys. Volume 4. 1979-February, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1979-Feb 80,
William E. Reed. Mar 80, 139p
Supersedes NTIS/PS-79/0221, NTIS/PS-78/0201, and NTIS/PS-77/0161. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-78/0198 and PB80-805831. See also Volume 1, 1970-1973, NTIS/PS-76/0107 and Volume 2, 1974-March, 1977, NTIS/PS-78/0200, and Volume 3, 1977-1978, PB80-805849.

Worldwide research is cited on cobalt-, iron-, and nickel-based superalloys. The manufacture, melting, casting, powder metallurgy, forging, and welding of these alloys are covered. Studies on corrosion, high and low temperature properties, physical, and mechanical properties of these materials are included. Applications discussed include nuclear reactors, gas turbines, superconducting machinery, and heat exchangers. (This updated bibliography contains 132 abstracts, 126 of which are new entries to the previous edition.)

PB80-806011 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tungsten and Tungsten Alloy Powder Metallurgy (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
William E. Reed. Mar 80, 134p
Supersedes NTIS/PS-79/0222 and NTIS/PS-78/0163. For the companion Published Search of the Engineering Index Data Base, see PB80-806029.

Federally-funded studies on fabricating and processing of tungsten, its alloys and composites are cited. Methods described include compacting, pressing, sintering, extruding, and rolling. Infiltration of porous tungsten shapes is also covered. The mechanical properties, thermal properties, and microstructure of these products are reported. Some products studied are rocket nozzles, nuclear reactor materials, and porous ionizers. (This updated bibliography contains 127 abstracts, 5 of which are new entries to the previous edition.)

PB80-806029 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tungsten and Tungsten Alloy Powder Metallurgy (Citations from the Engineering Index Data Base).
Rept. for 1970-Feb 80,
William E. Reed. Mar 80, 255p
Supersedes NTIS/PS-79/0223 and NTIS/PS-78/0164. For the companion Published Search of the NTIS Data Base, see PB80-806011.

Worldwide journal articles are cited on tungsten powder preparation and processing. Studies include sintering, densification, shrinkage, phase analysis, and heat treatment. The physical and mechanical properties of tungsten powder metal products are included. The effects of additives and particle size on the sintering and sintered articles are also described. (This updated bibliography contains 248 abstracts, 31 of which are new entries to the previous edition.)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A079 808/2 PC **A05**/MF **A01**
Southwest Research Inst San Antonio TX Mobile Energy Div
The Feasibility of Oil Analysis for Air Force Diesel Engines.
Final rept. 18 Sep 78-18 Jun 79,
J. P. Cuellar, Jr., L. L. Stavinoha, J. D. Tosh, J. A. Russell, and B. R. Wright. Jun 79, 97p SWRI-MED112, SAALC-006181
Contract F41608-78-C-B224

A feasibility study dealing with the implementation of an oil analysis program for Air Force diesel engines is described. Engine types were categorized and information assembled on characteristics, rebuild costs, and rebuild rates. Promising equipment classes for oil analysis were identified in this

effort. A second task formulated a set of recommended analytical procedures based on survey of current military and commercial practices in the area of oil analysis. An examination of the cost factors relevant to program implementation showed that the estimated savings/cost ratio is marginally attractive. Limiting the program to only selected equipment classes, it was estimated that a maximum return of $1.97 could be expected for each program dollar invested. (Author)

N80-16165/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Mechanisms of Lubrication and Wear of a Bonded Solid Lubricant Film.
R. L. Fusaro. 1980, 40p NASA-TM-81396, E-296
Conf-Proposed for Presentation at 35TH Ann. Meeting of the AM. Soc. Of Lubrication Engr., Anaheim, Calif., 5-8 May 1980.

To obtain a better understanding of how bonded solid lubricant films lubricate and wear (in general), the tribological properties of polyimide-bonded graphite fluoride films were studied (in specific). A pin-on-disk type of testing apparatus was used; but in addition to sliding a hemispherically tipped rider, a rider with a 0.95 mm diameter flat area was slid against the film. This was done so that a lower, less variable contact stress could be achieved. Two stages of lubrication occurred. In the first, the film supported the load. The lubricating mechanism consisted of the shear of a thin surface layer (of the film) between the rider and the bulk of the film. The second occurred after the bonded film had worn to the substrate, and consisted of the shear of very thin lubricant films between the rider and flat plateaus generated on the metallic substrate asperities. The film wear mechanism was strongly dependent on contact stress.

PAT-APPL-6-100 179 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Grease Compositions.
Patent Application,
John B. Christian. Filed 4 Dec 79, 18p AD-D006 888/2
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to grease compositions containing additives which inhibit rust and corrosion in high humidity and high temperature environments. More specifically, the present invention is concerned with a grease composition comprising (1) a major amount of a polyfluoroalkylether base fluid, (2) a minor amount of a thickener for the base fluid, and (3) a rust and corrosion inhibiting amount of a benzimidazole.

PAT-APPL-6-100 180 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Grease Compositions Based on Fluorinated Polysiloxanes.
Patent Application,
John B. Christian. Filed 4 Dec 79, 17p AD-D006 887/4
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to grease compositions which have a fluorinated polysiloxane as a base fluid and containing an additive which imparts rust and corrosion resistance to the compositions.

PATENT-4 185 031 Not available NTIS
Department of the Air Force Washington DC
Fluorinated Phosphinic Acids.
Patent,
Hyman D. Gillman, and James P. King. Filed 27 Sep 78, patented 22 Jan 80, 5p AD-D006 841/1, PAT-APPL-946 265
Supersedes PAT-APPL-946 265-78, AD-D005 575.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Fluorinated phosphinic acids prepared by reaction of fluorinated olefins with an acid containing one or more P-H bonds in the presence of a free radical initiator. The reaction products of the acids with various metal centers are effective grease thickeners for liquid lubricants. (Author)

11I. Plastics

AD-A079 545/0 PC **A03**/MF **A01**
Bristol Univ (England) H H Wills Physics Lab
The Physical Mechanisms Responsible for the Weathering of Epoxy Resins and GFR Epoxy Resins.
Annual technical rept. Oct 78-Oct 79,
C. Alexandre, T. W. Turner, and K. H. G. Ashbee. Oct 79, 34p
Grant DA-ERO-78-G-117

Experiments are described where the cylindrically symmetric fields associated with the fibre/resin interface are explored by examination in the optical microscope. The patterns of birefringence show how the difference of the principal stresses vary with distance from the fibre. Changes in the load transfer at the interface during hot water uptake have been detected. Specimens examined include E and S glass fibres totally embedded in epoxy resin slabs as well as 1 mm thick transverse sections through a undirectional composite. The ultrasonic photoelastic method has given way to a more direct approach to investigate SiO2/epoxy resin interfaces, where epoxy coated X-cut slabs of quartz are stimulated piezoelectrically and the resonant mechanical vibration examined. Attempts to incorporate the quartz slabs into the transducer in visualization experiments have so far failed to produce fringes. The computer model to simulate the stress fields is described. A finite element approach is taken treating the fibre as purely elastic in an elastoplastic resin matrix. The aim is to treat the interfacial region as a third phase of finite dimensions.

AD-A079 607/8 PC **A03**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Chemical Engineering
Physical Aging Studies of Semicrystalline Poly(ethylene Terephthalate).
Technical rept.,
Martin R. Tant, and Garth L. Wilkes. 9 Nov 79, 27p Rept no. TR-1
Contract N00014-78-C-0629

Physical aging of semicrystalline poly(ethylene terephthalate) has been investigated as a function of crystalline content. Stress-strain, stress relaxation, and differential scanning calorimetry experiments were used to monitor the physical aging process. It was found that both the overall extent and the rate of physical aging in this material decrease with increasing crystallinity. Several possible reasons for this behavior are advanced and discussed. It was also found that the drawing behavior of amorphous PET changes significantly as physical aging progresses. Specifically, for samples aged and then elongated, the extent of localized deformation (necking) and associated strain-induced crystallization was greater for samples aged for longer periods of time. (Author)

AD-A079 608/6 PC **A02**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Chemical Engineering
Physical Aging Studies of Styrene-Butadiene and Carbonate-Siloxane Block Copolymers.
Technical rept.,
Martin R. Tant, and Garth L. Wilkes. 19 Nov 79, 24p Rept no. TR-2
Contract N00014-78-C-0629

The physical aging process in styrene-butadiene and carbonate-siloxane block copolymers has been studied by monitoring the time dependent changes in mechanical and thermal properties. Specifically, stress-strain, stress relaxation and differential scanning calorimetry experiments were utilized. For the styrene-butadiene systems, it was found that the rate of physical aging increases with decreasing glassy content between 50 and 100% glass. However, the rate must decrease to zero when the percent glass reaches zero. The occurrence of physical aging was also noted in the polycarbonate siloxane block copolymer investigated. The data are discussed in light of the practical ramification of utilizing these block copolymers in material applications. (Author)

AD-A079 745/6 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Materials Sciences Lab
Thermal Outgassing of DC 93-500, a TWT Encapsulant.
Final rept. 1 Jun-30 Sep 78,
C. A. Gaulin, V. L. Knight, and M. Buechler. 30 Sep 79, 37p TR-0079(4402)-2, SAMSO-TR-79-39
Contract F04701-78-C-0079

The silicone traveling wave tube (TWT) encapsulant DC 93-500 has been subjected to thermal/vacuum analyses to verify its thermal stability and determine the extent of outgassing at the most severe expected operating conditions. Some limited comparisions have been made with a potential substitute encapsulant, Sylgard-184. The thermal stability of 93-500 is entirely satisfactory under the conditions studied (120 C, vacuum, long term). Significant outgassing was detected. Sufficient characterization was carried out to identify the mechanism of outgassing as being due to hydrolysis of silane by residual water in 93-500 base resin. The reaction produces volatile mono-vinyl silanol with appreciable quantities of hydrogen as a byproduct. The possible influence of the outgassing on the ultimate mechanical properties is discussed, as well as the potential for contamination of adjacent optical surfaces, and the possibility of the reaction as a source of hydrogen within the tubes. Firm answers to the additional questions raised by this study are not presently available. (Author)

AD-A079 778/7 PC **A14**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Structures and Properties of Polyurethanes. Part II,
Yu. S. Lipatov, Yu. Yu. Kercha, and L. M. Sergeyeva. 23 Mar 79, 304p Rept no. FTD-ID(RS)T-0111-79-PT-2
Unedited machine trans. of mono. Struktura i Svoystva Poliuretanov, Kiev, 1970 p1-279. See also Part 1, AD-A079 779.

No abstract available.

AD-A079 779/5 PC **A16**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Structure and Properties of Polyurethanes. Part 1,
Yu. S. Lipatov, Yu. Yu. Kercha, and L. M. Sergeyeva. 23 Mar 79, 351p Rept no. FTD-ID(RS)T-0111-79-PT-1
Unedited machine trans. of mono. Struktura i Svoystva Poliuretanov, Kiev, 1970 p1-279. See also Part 2, AD-A079 778.

No abstract available.

AD-A079 798/5 PC **A03**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Crosslinking Chemistry for Fluorocarbon Ether Bibenzoxazole Polymers.
Final technical rept. May 76-Jun 78,
R. C. Evers, and T. Abraham. Nov 79, 33p Rept no. AFML-TR-79-4148

Curable and hydrolytically stable FEB copolymers were synthesized by the acetic acid-promoted copolycondensation of tetrafluoroethylene oxide: hexafluoropropylene oxide-derive dithioimidate esters with fluorocarbon ether bis(o-aminophenol) monomers and a fluorocarbon bis(o-aminophenol) monomer containing an aliphatic hydrocarbon cure site. The structure of the cure site monomer was molecularly tailored to possess sufficient solubility and reactivity during the polycondensation reactions to permit incorporation of the appropriately structured cure sites into the FEB copolymer backbone. Thermogravimetric analysis and isothermal aging studies indicated high thermooxidative stability almost comparable to analogous FEB polymers void of the hydrocarbon cure sites. Isothermal aging in air at 260C (500F) and 288C (550F) for 200 hours led to weight losses of 7 and 17 percent, respectively. Preliminary formulation and curing studies demonstrated the reactivity of the cure sites to radical-induced cure reactions. Based on the low temperature viscoelastic properties, the high thermooxidative and hydrolytic stability, as well as the ready curability of the FEB copolymers, a broader use temperature range capability than currently available in state-of-the-art elastomer materials is envisioned. (Author)

AD-A080 029/2 PC **A02**/MF **A01**
Rochester Univ NY Dept of Mechanical and Aerospace Sciences
Microstructural Processes in the Deformation and Fracture of Polymers.
Final rept. 1 Aug 76-30 Sep 79,
J. C. M. Li. 17 Dec 79, 16p ARO-13566.4-MS
Grants DAAG29-76-G-0314, DAAG29-78-G-0159

Shear bands in polystyrene were characterized with respect to their surface morphology, shear strain distribution, strain recovery by annealing, intersection behavior, splitting and joining processes, and yield criteria. Three kinds of shear bands are differentiated, fine bands, coarse bands, and thick bands. The first two kinds have different yield criteria, propagation modes, and surface appearances. The latter two kinds have many similarities. It seems that molecular alignment of directional defects must present in shear bands. (Author)

AD-A080 068/0 PC **A04**/MF **A01**
Celanese Research Co Summit NJ
Processing Mechanisms, Structure and Morphology of High Temperature Polymeric Alloys. Part II.
Final technical rept. 1 Feb 77-31 Jan 79,
Ian L. Hay, Jay R. Shaner, Peter K. Sullivan, Ted T. L. Chang, and Richard R. Kemmerer. Mar 79, 72p AFOSR-TR-78-0954-PT-2
Contract F49620-77-C-0046
See also part 1, AD-A054 772.

The processing conditions expected to optimize interactions at a molecular level between poly(bisbenzimidazobenzophenanthroline) (BBB) and polybenzimidazole (PBI) have been investigated and the reaction products evolved under these conditions examined. Studies of the mechanical properties and the morphology indicate that binary interactions between BBB-BBB, PBI-PBI and BBB-PBI may all be occurring. The BBB-BBB interactions occur at temperatures greater than 500 C but PBI-PBI and BBB-PBI interactions arise at temperatures more than 100 C lower. Mass spectroscopic studies indicate that the principal reaction products in the presence of PBI are water and phenol whereas with BBB alone only water is evolved. Moreover in the mixture of BBB-PBI, phenol is evolved at lower temperatures than is the case with PBI alone. Possible end group reactions and reactions with partially cyclized rings, consistent with the observed evolution of water and phenol, are proposed for the improved processability of BBB in the presence of PBI. Further work to confirm the proposed reactions and the use of other additives to enhance these reactions is recommended. (Author)

AD-B011 796/0 PC **A05**/MF **A01**
Systems Research Labs Inc Dayton Ohio
Thermogravimetric-Mass Spectrometric Polymer Analysis.
Technical rept. Apr 74-Mar 75,
E. G. Jones, and Paul A. Benadum. Jul 75, 89p AFML-TR-75-130
Contract F33615-72-C-1537
See also Rept. no. AFML-TR-74-178, AD-B002 992L.
Distribution limitation now removed.

Thermogravimetric-mass spectral (TGMS) analyses of the volatile products of thermal degradation of sixteen polymers are reported. Perfluoro- and perfluoroether-substituted benzoxazoles comprise the majority of the samples. Perfluoro-substituted benzoxazoles, in general, display one temperature region of volatile-product formation. The volatile products tend to be perfluorocarbons. Perfluoroether-substituted benzoxazoles, depending upon the structure and location of the substitution, tend to display one or two temperature regions of volatile-product formation. The temperature at which the high-temperature process occurs coincides with that for decomposition of the perfluoro-substituted benzoxazoles. Some of the other samples analyzed include acetylene-terminated imides and quinoxolines. No appearance of volatile products from the imides or quinoxolines was noted at or below the curing temperature. (Author)

PAT-APPL-6-056 767 PC **A02**/MF **A01**
Department of the Navy Washington DC
Reversible Plasticizer for Solid State Deformation Processes.
Patent Application,
Roger S. Porter, and Anagnostis E. Zechariades. Filed 12 Jul 79, 8p AD-D006 809/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Ammonia is utilized as a reversible plasticizer in the deformation of thermoplastic polyamides so as not to degrade the mechanical properties of the deformed material. It may be retained in the material under pressure and/or low temperature during extrusion or other deformation processes and is spontaneously released with time and at reduced pressure and/or elevated temperature at the end of the process, such as at the exit side of an extruder die. (Author)

PAT-APPL-6-097 778 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Phenylmethylpolysilane Polymers and Process for Their Preparation.
Patent Application,
Robert C. West. Filed 27 Nov 79, 10p AD-D006 889/0
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to phenylmethylpolysilane polymers. In one aspect, it relates to a process for preparing the polymers. (Author)

PAT-APPL-6-100 327 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Purification of Acetylene-Terminated Polyimide Oligomers.
Patent Application,
Michael A. Lucarelli. Filed 5 Dec 79, 10p AD-D006 883/3
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a process for purifying acetylene-terminated polyimide oligomers.

PATENT-4 181 678 Not available NTIS
Department of the Air Force Washington DC
Symmetrical Perfluoroalkylene Oxide Alpha, Omega-Diacyl Fluorides.
Patent,
Theodore Psarras. Filed 15 Sep 78, patented 1 Jan 80, 4p AD-D006 835/3, PAT-APPL-942 571
Supersedes PAT-APPL-942 571-78, AD-D005 571.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Symmetrical perfluoroalkylene oxide alpha, omega-diacyl fluoride is prepared by reacting a perfluoroalkylene oxide, alpha, omega-diiodide with fuming sulfuric acid in the presence of zinc sulfate while adding chlorine. (Author)

PATENT-4 181 679 Not available NTIS
Department of the Air Force Washington DC
Omega-Iodoperfluoroalkylene Oxide Acyl Fluorides.
Patent,
Theodore Psarras. Filed 24 Oct 78, patented 1 Jan 80, 4p AD-D006 836/1, PAT-APPL-954 943
Supersedes PAT-APPL-954 943-78, AD-D005 587.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Omega-Iodoperfluoroalkylene oxide acyl fluorides are prepared by reacting a perfluoroalkylene oxide alpha, omega-diiodide with fuming sulfuric acid in the presence of zinc sulfate. The iodoacyl fluorides are intermediates for use in synthesizing perfluoroalkylene ether diimidate esters. (Author)

PATENT-4 181 681 Not available NTIS
Department of the Air Force Washington DC
2-Amino-4-Ethynylphenol.
Patent,
Robert C. Evers, and George J. Moore. Filed 19 Jul 78, patented 1 Jan 80, 5p AD-D006 837/9, PAT-APPL-925 899
Supersedes PAT-APPL-925 899-78, AD-D005 279.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

2-Amino-4-ethynylphenol, a novel compound, is prepared by a four-step synthetic sequence in which the key reaction is the treatment of 4-acetoxy-3-nitroacetophenone with a Vilsmeier reagent derived from N,N-dimethylformamide and phosphorus oxychloride. The compound is useful as an endcapping agent in the synthesis of fluorocarbon ether bibenzoxazole oligomers which, because of the presence of acetylenic terminal groups, can be cured by thermal means to provide broad-use temperature, fuel and fluid resistant vulcanizates. (Author)

11J. Rubbers

N80-16166/4 PC **A02**/MF **A01**
Idaho Univ., Moscow. Dept. of Chemical Engineering.
Perfluoroether Triazine Elastomers.
Final Report, 1 Mar. 1979 - 29 Feb. 1980.
R. A. Korus. 1980, 25p NASA-CR-162748
Grant NSG-2367

In order to obtain high performance elastomers with the high thermal stability and chemical inertness of perfluoroalkylene triazine and a low glass transition temperature, perfluoroether triazine elastomers were synthesized. The procedure for elastomer synthesis is described as well as general experimental methods. Results are presented and discussed. The screening of catalysts for the dehydration of perfluoroether diamide is also considered.

PAT-APPL-6-087 269 PC **A02**/MF **A01**
Department of the Navy Washington DC
A Method to Determine the Shear Absorption of a Rubberlike Material.
Patent Application,
Guillermo Gaunaurd . Filed 22 Oct 79, 11p AD-D006 897/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The shear absorption of a viscoelastic material is determined by directing acoustical energy at the viscoelastic material and sampling the backscattered signals that result when compressional waves propagate through the material and are scattered by either a fluid-filled or evacuated cavity contained therein. The backscattered signals are converted to a resonance amplitude versus frequency domain and the shear absorption of the viscoelastic material is determined from the frequency and the half-width of the resonance peaks. (Author)

11L. Wood and Paper Products

PAT-APPL-6-047 172 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Process for Preservation of Stored Wood Chips.
Patent Application,
E. L. Springer. Filed 8 Jun 79, 15p PB80-141419
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is a process which inhibits the loss of wood substance, tall oil and chip brighteners in wood chips during storage. The process involves treating wood chips with a dilute aqueous solution of formaldehyde and a phenol. This treatment effectively prevents the evolution of heat from the chips and microbial growth and thus limits chip deterioration and brightness loss while preserving tall oil. The process is also effective in preserving other moist plant-derived raw materials.

PATENT-4 170 668 Not available NTIS
Department of the Interior, Washington, DC.
Method for Wood Precharring.
Patent,
Calvin K. Lee, and Robert F. Chaiken. Filed 15 Sep 78, patented 9 Oct 79, 5p PB80-139215, PAT-APPL-942 851

Supersedes PB-292 204.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention describes a method of forming a prechar-layer on wood to cause it to become fire and rot retardant. In an air or a low oxygen concentration atmosphere the wood is uniformly charred at a depth of at least 3 millimeters by a high-intensity radiant heat panel. Normally the heat panel is spaced from and moved with respect to the wood. The relative velocity of the wood past the radiant panel and the panel's emitted heat flux are used to control the depth of charring. Preferably fire and/or rot retard chemicals and/or treatments are added to the formed charred layer to further increase the wood's fire and rot retardancy.

PB80-127160 PC **A03**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Wood and Paper Science.
An Integrated Approach to the Conversion of Lignocellulose from Wood into Useful Chemicals.
Interim progress rept. 1 Apr-30 Jun 78,
Irving S. Goldstein. 1978, 27p NSF/RA-780701
Grant NSF-PFR77-12243
See also report dated 1979, PB-301 059.

Progress is reported on the project to convert hemicelluloses, lignin, and cellulose from low-quality southern hardwoods into useful chemicals in a systematic, integrated manner. Specific objectives include prehydrolysis of hemicelluloses for optimum conversion to sugars; hydrolysis of cellulose to glucose using strong hydrochloric acid; conversion of lignin residues to low molecular weight phenolic compounds; and preliminary process design of an integrated wood chemical plant. Experimental methods are described for these investigations. Experiments identified the alpha-cellulose content of sweetgum holocellulose. A pretreatment procedure was developed for removing chloride from reaction samples thereby providing a rapid analytical chromatographic method for soluble sugar hydrolysis products acceptable for routing kinetics experiments. Twenty hydrolysis and hydrogenolysis reactions were conducted on liquors from strong hydrochloric acid hydrolysis. Complete conversion to lower molecular weight organic soluble materials is reported. A preliminary process design procedure has been developed for analysis and evaluation of a plant for hydrochloric acid prehydrolysis of hardwoods.

PB80-140734 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Pulpwood Production in the Northeast, 1969.
Forest Service resource bulletin,
James T. Bones, and David R. Dickson. 1970, 40p FSRB/NE-22, NEFES-80-11
See also report dated 1967, PB-185 114.

The report is a survey of pulpwood production from roundwood in the 14 Northeastern States by counties and species groups, and pulpwood chip production from plant residues. Comparisons are made with the previous year's production data. Trends in pulpwood production for the past 7 years are shown for the Northeast.

PB80-141179 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Pulpwood in the Northeast: Past, Present, and Future.
Forest Service resource bulletin,
Neal P. Kingsley. 1971, 25p FSRB/NE-23, NEFES-80-12

A look at the past and present of the pulpwood and woodpulp industries in the 14 northeastern States provides the background for discussing the future of the pulpwood industry in the Northeast. A projection of pulpwood production to 1985 is presented. Also discussed are what forms of pulpwood will be produced, what sections of the region have the greatest potential for increases in pulpwood production, what effect recent and future mill closings will have on future pulpwood production, and what the possible influence of waste paper recycling on the future demand for pulpwood in the Northeast.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A079 534/4 PC **A03**/MF **A01**
Southeastern Massachusetts Univ North Dartmouth
A Computational Method for Solving Parabolic Partial Differential Equations.
Final rept. 1 Jan 78-31 Jul 79,
Thomas B. C. Shen. Nov 79, 41p AFOSR-TR-80-0017
Grant AFOSR-78-3538

This paper presents a new numerical method, the error method, for solving parabolic type partial differential equations, linear or nonlinear. In particular, by comparing with the regular successive iterative method, more beneficial results in the application to nonlinear problems. Three nonlinear examples were studied by using this method. All resulted in large reduction of number of iteration loops and CPU time required in comparing to the corresponding regular successive method used. Generalization and modification of this method appears appropriate to extend its application to elliptical type partial differential equation so that problems with 'isolated' events (such as those with ignition spots) may be handled with this method. (Author)

AD-A079 536/9 Not available NTIS
Stanford Univ CA
Unique Factorization of Products of Bivariate Normal Cumulative Distribution Functions,
T. W. Anderson, and S. G. Ghurye. 21 May 77, 8p
Contract N00014-75-C-0442, Grant NSF-MPS75-09450
Availability: Pub. in Annals of the Institute of Statistical Mathematics, v30 n1 ptA p63-69 1978 (No copies furnished by DTIC).

No abstract available.

AD-A079 554/2 PC **A02**/MF **A01**
Massachusetts Univ Amherst Dept of Mathematics and Statistics
Similarity Measures on Binary Attribute Data - II.
Technical rept.,
M. F. Janowitz. Dec 79, 21p Rept no. TR-J7902
Contract N00014-79-C-0629
See also AD-A077 627.

The exact nature of the coefficient of special similarity is investigated, and its ability to recognize Gilmour natural classification is compared to that of various other similarity measures by means of a computer simulation of the classification problem. (Author)

AD-A079 571/6 PC **A02**/MF **A01**
Texas Univ At Austin Electronics Research Center
Discrete Time Optimal Nonlinear Estimation,
Steven I. Marcus. 1978, 7p AFOSR-TR-79-1294
Contract F49620-77-C-0101, Grant NSF-ENG76-11106
Pub. in Proceedings of the IEEE Conference on Decision and Control (1978), San Diego, CA, 10-12 Jan 79 p274-279.

No abstract available.

AD-A079 704/3 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Dispersion Mapping Theorems.
Technical summary rept.,
R. Creighton Buck. Sep 79, 21p Rept no. MRC-TSR-1994
Contract DAAG29-75-C-0024, Grant NSF-MCS78-07244

A function of three variables is often regarded as inherently simpler than a function of five variables, and there has been much attention given to the nature of complicated functions that can be expressed exactly in various ways in terms of simpler functions. From the viewpoint of computation, however, it is sufficient if a function F can be approximated arbitrarily well by combinations of simple functions. This paper deals with the general structure of this process, and obtains specific theorems that help to describe its limitations, and necessary conditions on the functions F for which this is possible. More detailed applications will be made in the future.

AD-A079 705/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
An Estimate Related to the Strong Maximum Principle.
Technical summary rept.,
Haiem Brezis, and Pierre-Louis Lions. Sep 79, 11p Rept no. MRC-TSR-1995
Contract DAAG29-75-C-0024

Some of the most useful and important tools in the study of elliptic boundary value problems are maximum principles. So called strong maximum principles provide strict inequalities when appropriate conditions are fulfilled. In this work a strong maximum principle is improved by exhibiting an explicit estimate sharper than what follows from usual arguments. (Author)

AD-A079 710/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Arithmetic of Complex Sets.
Technical summary rept.,
Karl Nickel. Oct 79, 21p Rept no. MRC-TSR-2009
Contract DAAG29-75-C-0024

Let II(IR) be the set of all real closed intervals and let omega sub 1: equal (+,-,multiplication,/) be the set of arithmetic operators on IR. By extending omega sub 1 from IR to II(IR) as usual one finds that II(IR) is closed with respect to the operations from omega sub 1. (Author)

AD-A079 717/5 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Derivatives and Codifferentials of Maps with Closed Convex Graphs and Convex Operators.
Technical summary rept.,
Jean-Pierre Aubin. Oct 79, 50p Rept no. MRC-TSR-2011
Contract DAAG29-75-C-0024

We complete the study of contingent cones to a subset K and of the contingent derivatives of a set valued map F when K and the graph of F are closed and convex. In this case, the contingent cone is a closed convex cone (called the tangent cone) and the contingent derivative is a convex process (a set-valued map whose graph is a closed convex cone). The transpose of the contingent derivative is another convex process, called the codifferential, which plays a quite important role. We present a calculus of tangent cones to closed convex sets and we adopt the basic results of convex analysis to the case of set-valued maps with closed convex graph. This study is motivated by the crucial role played by convex cones in optimization, fixed-point theory and flow-invariance of dynamical systems. (Author)

AD-A079 720/9 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Some Continuity Properties of Polyhedral Multifunctions.
Technical summary rept.,
Stephen M. Robinson. Oct 79, 16p Rept no. MRC-TSR-2014
Contract DAAG29-75-C-0024, Grant NSF-MCS74-20584
Sponsored in part by Grant NSF-MCS79-01066.

A multifunction is polyhedral if its graph is the union of finitely many polyhedral convex sets. This paper points out some fairly strong continuity properties that such multifunctions satisfy, and it shows how these may be applied to such areas as linear complementarity and parametric programming. (Author)

AD-A079 721/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Use of the Tetrachoric Series for Evaluating Multivariate Normal Probabilities.
Technical summary rept.,

Bernard Harris, and Andrew P. Soms. Oct 79, 39p Rept no. MRC-TSR-2015
Contract DAAG29-75-C-0024

The tetrachoric series is a technique for evaluating multivariate normal probabilities frequently cited in the statistical literature. In this paper we have examined the convergence properties of the tetrachoric series and have established the following. For orthant probabilities, the tetrachoric series converges if abs.val.(rho sub ij) < 1/(k-1), < or = i < j < or = k, where rho sub ij are the correlation coefficients of a k-variate normal distribution. The tetrachoric series for orthant probabilities diverges whenever k is even and rho sub ij > 1/(k-1) or k is odd and rho sub ij > 1/(K-2), 1 < or = i < j < or = k. Other specific results concerning the convergence or divergence of this series are also given. The principal point is that the assertion that the tetrachoric series converges for all k > or = 2 and all rho sub ij such that the correlation matrix is positive definite is false.

AD-A079 722/5 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
One-Sided Continuous Dependence of Maximal Solutions.
Technical summary rept.,
Eric Schechter. Nov 79, 23p Rept no. MRC-TSR-2016
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525

Existence of a maximal solution is proved for a differential equation satisfying a one-sided variant of Caratheodory's condition. The maximal solution is shown to dominate all solutions of a very general differential inequality. Also a best-possible condition is proved for the dependence of the maximal solution on the initial data and on the right-hand side of the equation. (Author)

AD-A079 724/1 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On the Maximality of the Sum of Two Maximal Monotone Operators.
Technical summary rept.,
Hedy Attouch. Nov 79, 13p Rept no. MRC-TSR-2018
Contract DAAG29-75-C-0024

A wide variety of problems involving nonlinear partial differential equations, subject to boundary conditions, may be shown to have solutions by establishing that the associated differential operators satisfy a certain technical condition. This condition, called maximal monotonicity, allows the use of a well developed abstract theory which includes results about existence, regularity, etc., of solutions of operator equations. It is quite useful, therefore, to have easily verified conditions which imply that an operator is maximal monotone. Frequently an operator may be regarded as the sum of simpler components. This paper gives a new sufficient condition which guarantees that the sum of two maximal monotone operators is again maximal monotone. (Author)

AD-A079 725/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Bifurcations of a Model Diffusion-Reaction System.
Technical summary rept.,
R. Aris. Nov 79, 28p Rept no. MRC-TSR-2019
Contract DAAG29-75-C-0024

After some general observations on kinetic, compartmental and distributed systems a model suggested by Roessler is explored. Bifurcations to unsymmetric steady and uniform oscillatory states from the uniform steady states are demonstrated and the former are shown to break down into oscillations of increasing complexity. (Author)

AD-A079 726/6 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Nearly Balanced Incomplete Block Designs.
Technical summary rept.,
Ching-Shui Cheng, and Chien-Fu Wu. Nov 79, 20p Rept no. MRC-TSR-2020
Contract DAAG29-75-C-0024, Grant NSF-MCS79-01846
Sponsored in part by Grant NSF-MCS79-09502.

A class of nearly balanced incomplete block designs is defined. This extends the concept of regular graph designs of John and Mitchell (1977) to the unequally replicated case. Some necessary conditions on the existence of such designs are derived. Methods of construction are given for some special cases. For five or six varieties, the 'best' nearly balanced incomplete block designs and their efficiencies are tabulated. (Author)

AD-A079 727/4 PC **A06**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Closed-Loop Eigenvalue Specification for Infinite Dimensional Systems: Augmented and Deficient Hyperbolic Cases.
Technical summary rept.,
David L. Russell. Nov 79, 118p Rept no. MRC-TSR-2021
Contract DAAG29-75-C-0024, Grant AFOSR-79-0018

We introduce a method for reduction of a class of distributed parameter control systems to a corresponding control canonical form which has the same intermediate 'control Jordan form' as the original system. Using this reduction together with certain results concerning the completeness and independence properties of complex exponentials we are able to study the problem of eigenvalue specification (pole placement for certain classes of hyperbolic systems which are more general than those discussed in the earlier paper. (Author)

AD-A079 728/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Globally Convergent Ball Newton Method.
Technical summary rept.,
Karl L. Nickel. Nov 79, 33p Rept no. MRC-TSR-2022
Contract DAAG29-75-C-0024

A new n-dimensional Newton method is presented. In each step a whole n-dimensional ball is determined rather than a single new approximation point. This ball contains the desired zero of the given function. The method is globally convergent. If the given initial ball does not contain any zero, then the method stops after a finite number of steps. Depending upon the assumptions which are made, the convergence of the ball radii is linear, superlinear or quadratic. (Author)

AD-A079 729/0 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On Subharmonic Solutions of Hamiltonian Systems.
Technical summary rept.,
Paul H. Rabinowitz. Nov 79, 37p Rept no. MRC-TSR-2023
Contracts DAAG29-75-C-0024, N00014-76-C-0300

Some existence results for T periodic solutions of (0.1) were presented in (1) for superquadratic Hamiltonian systems using finite dimensional minimax arguments together with estimates suitable to pass to a limit. An improved existence mechanism was introduced in (2) and applied to some of the super-quadratic problems of (1) as well as to several subquadratic cases. It will show here that these problems possess not only one T periodic solutions z sub 1 but infinitely many distinct subharmonic solutions z sub k. A word of caution must be entered at this point. Although z sub k has period kT, it may not be the case that z sub k has minimal (i.e. primitive) period kT. Indeed simple examples show that there may be an upper bound on the minimal period of z sub k.

AD-A079 731/6 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On Efficient Time-Stepping Methods for Nonlinear Second Order Hyperbolic Partial Differential Equations.
Technical summary rept.,
Richard E. Ewing. Sep 79, 28p Rept no. MRC-TSR-1996
Contract DAAG29-75-C-0024, Grant DAAG29-78-G-0161
Sponsored in part by Grant NSF-MCS78-09525.

Techniques useful for efficiently time-stepping Galerkin methods for various types of time-dependent partial differential equations are presented and analyzed. Second-order quasilinear hyperbolic problems with smooth solutions are studied as a simple model problem for illustrating the widely applicable techniques. The procedure involves the use of a preconditioned iterative method for approximately solving the different linear systems of equations arising at each time-step in a discrete-time Galerkin method. Optimal order L2 spatial errors and almost optimal order work estimates are obtained for the second-order hyperbolic equation. (Author)

AD-A079 732/4 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Implied Assumptions for some Proposed Robust Estimators.
Technical summary rept.,
Gina Chen, and George E. P. Box. Sep 79, 64p Rept no. MRC-TSR-1997
Contract DAAG29-75-C-0024

Assumptions which could motivate various L-estimators M-estimators are discussed. In particular, for samples of size ten a distribution in the contaminated expontential power family is found whose posterior mean approximates each of a number of proposed L-estimators. Also distributions in this family are found whose posterior modes approximate suggested M-estimators. (Author)

AD-A079 733/2 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Further Study of Robustification via A Bayesian Approach.
Technical summary rept.,
Gina Chen, and George E. P. Box. Sep 79, 51p Rept no. MRC-TSR-1998
Contract DAAG29-75-C-0024

A Bayesian model has been proposed which describes the generation of an observation by a process whereby with prior probability 1-alpha the usually assumed statistical structure is correct but with small probability alpha it is incorrect (for example, the observation has a very large variance). For a simple location estimate the nature of the down weighting of outlying observations produced by this model is studied and is compared with that of the presently popular M-estimators.

AD-A079 734/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Convergence of Abstract Splines.
Technical summary rept.,
Carl de Boor. Nov 79, 14p Rept no. MRC-TSR-1999
Contract DAAG29-75-C-0024

A sufficient condition is given for the convergence of abstract splines. We show that his condition is not necessary but that a slight perturbation of his condition is both necessary and sufficient. In the process, we also give a necessary and sufficient condition for a sequence of abstract spline projectors to be bounded.

AD-A079 735/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On Solving Robust and Generalized Linear Regression Problems.
Technical summary rept.,
David M. Gay. Sep 79, 35p Rept no. MRC-TSR-2000
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525
Presented at Nonlinear Optimization and Applications, 18-20 Jul 79, L'Aquila (Italy).

Many researchers employ mathematical models. Most models contain parameters, which may be chosen to make the model fit the available data as well as possible (in a sense that depends on the model). In this paper we consider the problem of

choosing the parameters for a common class of models in which the desired parameter vector minimizes an (unconstrained) objective function. We briefly give some examples of such problems, then discuss ways to exploit the common structure that these problems share. THis leads us to discussing strategies for solving general unconstrained minimization problems and to point out the advantages of using a so-called 'model/trust-region approach,' wherein the change made in the current parameter estimate is chosen so as to approximately minimize a local model of the objective function on an estimate of the region about the current iterate where this local model is reliable. For problems in which the residual vector r(x) is a nonlinear function of x, we recommend generalizations of some techniques that have proven worthwhile in nonlinear least-squares problems in which the optimal residual vector r(x*) may be either large or small.

AD-A079 736/5 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Nonlinear Oscillations and Boundary-Value Problems for Hamiltonian Systems.
Technical summary rept.,
Frank H. Clarke, and I. Ekeland. Sep 79, 26p
Rept no. MRC-TSR-2001
Contract DAAG29-75-C-0024

Hamilton's differential equations are basic in the study of theoretical mechanics. A particular class of motions of interest for such systems of equations are the periodic ones, which correspond to oscillations (vibrations) of the underlying physical system; the absence of such motions is usually associated with resonance phenomena. In this paper we give conditions on the Hamiltonian function H which guarantee the existence of periodic orbits, as well as other more general types of motions. One distinction with previous work on the subject is that we consider forced vibrations arising from external driving forces; another is that the solutions in question are characterized directly as the solutions of a specific minimization problem (i.e., we obtain a 'variational principle'), a feature which could prove useful for computational purposes.

AD-A079 737/3 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Study of Real Data.
Technical summary rept.,
Gina Chen, and George E. P. Box. Oct 79, 70p
Rept no. MRC-TSR-2002
Contract DAAG29-75-C-0024

Nine sets of real data are analyzed. The distributions within the contaminated exponential power family which best describe these data sets are obtained by maximum likelihood. It appears that heavy tailed distributions are often produced by secular inhomogeneity in mean and variance. A specific robust estimator would behave well if, in the real world, data occurred of the kind which favored it. In this paper more classical sets of data are considered and their characteristics are studied in relation to proposed robust estimators.

AD-A079 738/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Analysis of Mixed Methods Using Mesh Dependent Norms.
Technical summary rept.,
I. Babuska, J. Osborn, and J. Pitkaranta. Sep 79, 37p Rept no. MRC-TSR-2003
Contracts DAAG29-75-C-0024, DOE-E(40-1)3443
Sponsored in part by Grant NSF-MCS78-02851.

This paper presents a new approach to the analysis of mixed methods for the approximate solution of 4th order elliptic boundary value problems. In this approach one introduces a pair of mesh dependent norms and proves the approximation method is stable with respect to these norms. The error estimates then follow in a direct manner. In a mixed method, one introduces an auxiliary variable, usually representing another physically important quantity, and writes the differential equation as a lower order system. One then considers Ritz-Galerkin approximation schemes based on a variational formulation of this lower order system, thereby obtaining direct approximations to both the original and auxiliary variables. Three particular mixed methods for the approximate solution of the biharmonic problem are examined in detail.

AD-A079 739/9 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Why do we Need Significance Levels.
Technical summary rept.,
Tom Leonard. Oct 79, 20p Rept no. MRC-TSR-2004
Contract DAAG29-75-C-0024

Significance tests are commonly used in many application areas as attempts to formally confirm or refute specific conclusions. For example, in the social sciences (e.g. psychology, sociology, and econometrics) there is often much more emphasis on data-fitting and seeking 'significant' results than on developing proper mathematical models which reltae in an inductively sensible way to the real-life problem. In the present paper a new formulation is used to demonstrate that significance tests tend to be much too ready to reject the null hypothesis for large sample sizes. It is recommended that the usual percentage points should be replaced by quantities depending in a particular way upon sample size, but not upon a choice of significance level. The phenomena discussed would appear to be particularly relevant to the area of scientific reporting. For example, many results in applied journals which might have been viewed as 'significant,' because they yield a low p-value, may in fact serve to detract from the very scientific theory which they claim to substantiate. For large sample sizes, the techniques proposed in this paper permit a larger range of viable null hypotheses than experienced under fixed-size significance testing. It should therefore be easier to use them to find a data-credible model which is also reasonable in real-life terms.

AD-A079 744/9 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
Degree Sequences of Random Graphs.
Management science research rept.,
Gerard Cornuejols. Nov 79, 17p Rept nos. MSRR-451, WP-36-79-80
Contract N00014-75-C-0621

A property is said to be satisfied by almost all graphs on n vertices if the fraction of the graphs that satisfy it goes to 1 as n goes to infinity. For almost all graphs on n vertices the smallest vertex-degree is n/2 - sq. rt. $<(n \log n)/2> + o$ (sq. rt. n). More generally we estimate the values in the tails of the degree sequence.

AD-A079 807/4 PC **A02**/MF **A01**
Stanford Univ CA Dept of Statistics
The Anderson-Darling Statistic.
Technical rept.,
Michael A. Stephens. 31 Oct 79, 23p TR-39, TR-278, ARO-14435.39-M
Contract N00014-76-C-0475, Grant DAAG29-77-G-0031

The Anderson-Darling statistic A squared is a goodness-of-fit statistic, based on the empirical distribution function. Its asymptotic distribution can be found for testing many important distributions when unknown parameters must be estimated from the data. Furthermore, A squared can be easily adapted so that only the asymptotic points are needed for testing purposes. A squared also is easy to calculate, and has overall good power properties. The report gives a review of A squared and tables for testing the following distributions - normal, exponential, gamma, extreme-value and Weibull, and logistic; points are given also for testing any completely specified continuous distribution. (Author)

AD-A079 816/5 PC **A05**/MF **A01**
Rice Univ Houston TX Aero-Astronautics Group
Gradient Algorithms for the Optimization of Dynamic Systems.
Interim rept.,
A. Miele. 1979, 85p AAR-147, AFOSR-TR-79-1360
Grants AFOSR-76-3075, NSF-ENG79-18667

Recent advances in the area of gradient methods for optimal control problems are reviewed. Single-subarc problems are treated. Specifically, two classes of optimal control problems, called Problem P1 and Problem P2 for easy identification, are solved. Problem P1 consists of minimizing a functional I which depends on the n-vector state x(t), the m-vector control u(t), and the p-vector parameter 3.14. The state is given at the initial point. At the final point, the state and the parameter are required to satisfy q scalar relations. Problem P2 differs from Problem P1 in that the state, the control, and the parameter are required to satisfy k additional scalar relation along the interval of integration. Algorithms of the sequential gradient-restoration type are given for both Problem 1 and Problem 2. Problem P2 enlarges the number and variety of problems of optimal control which can be treated by gradient-restoration algorithms. Eight numerical examples are presented to illustrate the performance of the algorithms associated with Problem P1 and Problem P2. The numerical results show the feasibility as well as the convergence characteristics of these algorithms.

AD-A079 861/1 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Comparison of Numerical Analysis Methods for Solving One-Dimensional Elliptic Differential Equations.
Master's thesis,
Randy A. Smith. Dec 79, 158p Rept no. AFIT/GAE/AA/79D-17

Four numerical methods are used to solve a specific set of problems and then the methods are compared for accuracy and efficiency. The methods are: standard finite differences, collocation, Galerkin, and least squares. The latter three methods are finite element methods which use either Lagrange linear, Hermite cubic, or Hermite septic piecewise polynominals as interpolation functions. The problem set consists of second- and fourth-order, linear and nonlinear, differential equations with constant and variable coefficients. The linear equations govern elementary structural members and the nonlinear equation is a one-dimensional analog for transonic flow past an airfoil. The three major conclusions are:(1) the least squares method with Hermite cubic polynomials was the method of choice for the second-order linear equations, (2) the collocation method was chosen over Galerkin and the finite difference methods for the fourth-order equations, and (3) Galerkin method was chosen over the collocation method for the nonlinear problem. (Author)

AD-A080 034/2 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Combining and Updating of Local Estimates and Regional Maps Along Sets of One-Dimensional Tracks.
Interim rept.,
Alan S. Willsky, Martin Bello, David A. Castanon, Bernard C. Levy, and George Verghese . Nov 79, 59p LIDS-P-955, AFOSR-TR-80-0080
Contract N00014-76-C-0346, Grant AFOSR-77-3281

In this paper we consider the problem of combining and updating estimates that may have been generated in a distributed fashion or may represent estimates, generated at different times, of the same process sample path. The first of these cases has applications in decentralized estimation, while the second has applications in updating maps of spatially-distributed random quantities given measurements along several tracks. The method of solution for the second problem uses the result of the first, and the similarity in the formulation and solution of these problems emphasizes the conceptual similarity between many problems in decentralized control and in the analysis of random fields. (Author)

AD-A080 074/8 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Fast Parallel Realization of Matrix Multiplication.
Interim rept.,
E. V. Krishnamurthy, and Reinhard Klette. Nov 79, 31p TR-834, AFOSR-TR-80-0079
Grant AFOSR-77-3271

Fast parallel matrix multiplication algorithms in SIMD (Single-Instruction-Multiple-Data) and MIMD

(MUltiple-Instruction-Multiple-data) modes are described for implementation in a parallel-binary matrix processing system with facilities for bit-wise parallel Boolean operation and power-of-two shifts on Boolean matrices. A comparative study of these algorithms is made on the basis of their relative time-complexities, when conventional binary and prime-modulus arithmetic are used for forming the matrix product. (Author)

AD-A080 082/1 PC **A03**/MF **A01**
Brown Univ Providence RI Div of Applied Mathematics
On the Weak Convergence of a Sequence of General Stochastic Difference Equations to a Diffusion.
Interim rept.,
H. J. Kushner, and Hai Huang. Oct 79, 43p
AFOSR-TR-80-0014
Contract N00014-76-C-0279, Grant AFOSR-77-3063
Sponsored in part by Grant NSF-ENG77-12946.

A convenient and useful method for showing weak convergence, to a diffusion of the interpolated solutions of a (not necessarily Markovian) sequence of stochastic difference equations is developed. The technique involves the use of averaging methods to show that the weak limit satisfies the martingale problem of Strook and Varadhan which is associated with the diffusion. A truncation method is developed so that it is only necessary to work with the parts of the process before first escape from an arbitrary but bonded domain. The assumptions cover a wide variety of applications in systems theory, mathematical biology and elswhere but the method of proof is adaptable to other special cases where our particular assumptions might not hold. Two applications are given in order to illustrate the relative ease of use of the method. The driving noise process in the difference equations can depend on the solution process of the difference equation, and one application where this is useful is given (a rate of convergence problem for simple stochastic approximations with sequentially averaged observations). (Author)

AD-A080 083/9 PC **A03**/MF **A01**
Brown Univ Providence R I Div of Applied Mathematics
A Martingale Method for the Convergence of a Sequence of Processes to a Jump-Diffusion Process.
Interim rept.,
Harold J. Kushner. Jul 79, 28p AFOSR-TR-79-1273
Contract N00014-76-C-0279, Grant AFOSR-76-3063
Sponsored in part by Grant NSF-ENG73-03846

A convenient method for proving weak convergence of a sequence of non-Markovian processes x(epsilon) (.) to a jump-diffusion process is proved. Basically, it is shown that the limit solves the martingale problem of Strook and Varadhan. The proofs are relatively simple, and the conditions apparently weaker than required by other current methods (in particular, for limit theorems for a sequence of ordinary differential equations with random right hand sides). In order to illustrate the relative ease of applicability in many cases, a simpler proof of a known result on averaging is given. (Author)

N80-16798/4 PC **A02**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
Output Ensemble Average of Periodically Excited Linear Time-Varying Systems.
E. Besner, and J. Shinar. May 79, 22p TAE-372

Calculation of the mean square ensemble average of the nonstationary output of a linear time-varying system excited by a periodical random input is carried out by a direct method. Results can be obtained by a closed form solution or in a single computer run. The applicability of the method is illustrated using a missile intercept problem.

N80-16799/2 PC **A05**/MF **A01**
Virginia Univ., Charlottesville. School of Engineering and Applied Science.
Analysis and Testing of Numerical Formulas for the Initial Value Problem.
R. L. Brown, K. R. Kovach, and J. L. Popyack.
Jan 80, 95p NASA-CR-162655, UVA-528149-AMCS80-101
Grant NSG-1335

Three computer programs for evaluating and testing numerical integration formulas used with fixed stepsize programs to solve initial value systems of ordinary differential equations are described. A program written in PASCAL SERIES, takes as input the differential equations and produces a FORTRAN subroutine for the derivatives of the system and for computing the actual solution through recursive power series techniques. Both of these are used by STAN, a FORTRAN program that interactively displays a discrete analog of the Liapunov stability region of any two dimensional subspace of the system. The derivatives may be used by CLMP, a FORTRAN program, to test the fixed stepsize formula against a good numerical result and interactively display the solutions.

PB80-128671 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Need for a Common Metric in Item Bias Studies.
Final rept.,
Neil J. Dorans. Sep 79, 18p TM-79/20

A common metric is essential for valid comparisons in any investigations of subpopulation differences and similarities. Item bias studies are one type of investigation that focuses on testing for subpopulation differences. The techniques of latent trait theory, with its powerful property of item parameter invariance, have been applied at the item bias question. In the report, the property of item parameter invariance is examined, with primary consideration given to the importance of metric in studies that test for item bias by testing for item parameter invariance. Neutral, hypothetical examples illustrate some consequences of ignoring the importance of metric.

PB80-131808
(Order as PB80-131766, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Graph Coloring Algorithm for Large Scheduling Problems,
Frank Thomson Leighton. 6 Jun 79, 18p
Included in Jnl. of Research of the National Bureau of Standards, v84 n6 p489-506, Nov-Dec 79.

A new graph coloring algorithm is presented and compared to a wide variety of known algorithms. The algorithm is shown to exhibit O(n2) time behavior for most sparse graphs and thus is found to be particularly well suited for use with large-scale scheduling problems. In addition, a procedure for generating large random test graphs with known chromatic number is presented and is used to evaluate heuristically the capabilities of the algorithms discussed.

PB80-134885 Not available NTIS
National Bureau of Standards, Washington, DC.
Tests of Fourth-Order Difference Equations for Laplace's Equation in Cylindrical Coordinates.
Final rept.,
C. E. Kuyatt, and A. Galejs. 1978, 3p
Pub. in Proceedings of the International Conference on Electron and Ion Beam Science and Technology (8th) Held at Seattle, WA., on May 21-26, 1978, p655-657 1978.

While most digital computer solutions of Laplace's equation have employed the second-order five-point difference equations, a few recent calculations used nine-point difference equations. In principle, nine-point equations should be capable of giving the potential to an accuracy which is fourth-order in the mesh size. However, only Durand's equations are derived in such a way that fourth-order accuracy is clearly obtained. To demonstrate the accuracy of Durand's equations, and to assess the accuracy of other equations, the authors have tested several difference equations for cylindrical coordinates on the analytic potential distribution between two spheres.

PB80-143464 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
On the Distribution of the Hurst Range of Independent Normal Summands.
Final rept.,
A. A. Anis, and E. H. Lloyd. Jul 77, 36p RR-77-16
Prepared in cooperation with Ain Shams Univ., Cairo (Egypt)., and Lancaster Univ., Bailrigg (England).

The paper develops a general method for obtaining the probability distribution of the Hurst range of independent normal summands and obtains explicit results for the cases $n < or = 4$.

12B. Operations Research

AD-A079 707/6 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Abstract Optimality Theory.
Technical summary rept.,
Szymon Dolecki. Oct 79, 63p Rept no. MRC-TSR-2006
Contract DAAG29-75-C-0024, Grant AFOSR-79-0018

This work presents an abstract optimality theory. The discussed concepts (e.g. extremal, Lagrangian, duality) are more general and much simpler than their familiar counterparts used in more concrete framework. They admit geometrical interpretations and help to clarify the underlying ideas of the theory. Consequently, the presented theory suggests further theoretical developments and possible applications.

AD-A079 719/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Computing Optimal Locally Constrained Steps.
Technical summary rept.,
David M. Gay. Oct 79, 30p Rept no. MRC-TSR-2013
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525
Sponsored in part by Grant NSF-MCS76-00324.

In seeking to solve an unconstrained minimization problem, one often computes steps based on a quadratic approximation q to the objective function. A reasonable way to choose such steps is by minimizing q constrained to a neighborhood of the current iterate. This paper considers ellipsoidal neighborhood and presents a new way to handle certain computational details when the Hessian of q is indefinite, paying particular attention to a special case which may than arise. The proposed step computing algorithm provides an attractive way to deal with negative curvature. Implementations of this algorithm have proved very satisfactory in the nonlinear least-squares solver NL2SOL. (Author)

AD-A079 802/5 PC **A03**/MF **A01**
Stanford Univ CA Dept of Statistics
Optimal Whereabouts Search for a Moving Target.
Technical rept.,
Lawrence D. Stone, and Joseph B. Kadane. 15 Nov 79, 38p TR-40, TR-279, ARO-14435.40-M
Contract N00014-76-0475, Grant DAAG29-77-C-0031

This paper shows that solving the optimal whereabouts search problem for a moving target is equivalent to solving a finite number of optimal detection problems for moving targets. This generalizes the result of Kadane (5) for stationary targets. (Author)

AD-A079 815/7 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
An Equivalence between Two Algorithms for Quadratic Programming.
Management sciences research rept.,
Jong-Shi Pang. Dec 79, 28p Rept no. MSRR-452
Contract N00014-75-C-0621

In this paper, we demonstrate that the Van de Panne-Whinston symmetric simplex method when applied to a certain implicit formulation of a quadratic program generates the same sequence of

primal feasible vectors as does the Von Hohenbalken simplicial decomposition algorithmsm specialized to the same program. Such an equivalence of the two algorithms extends earlier results for a least-distance program due to Cottle-Djang. (Author)

AD-A079 912/2 MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
An Efficient Algorithm for Determining the Length of the Longest Dead Path in an 'LIFO' Branch-and-Bound Exploration Schema,
Stefano Pallottino, and Tommaso Toffoli. Jan 80, 13p Rept no. MIT/LCS/TM-149
Contract N00014-75-C-0661
Availability: Microfiche copies only.

The length of the longest dead path (LLDP) is a widely used parameter in estimating the efficiency of branch-and-bound optimization algorithms that employ the LIFO exploration schema. Thanks to two original theorems, we are able to present a particularly attractive procedure for determining of the LLDP. In fact this procedure requires a number of storage variables which is independent of problem size and very small; moreover, the procedure is self-contained in the sense that it can be externally attached to any LIFO branch-and-bound program without interfering with its algorithms and data structures. (Author)

AD-A079 969/2 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
How to Increase Speed and Savings: Simple Introduction to the Technique of 'Optimization',
Jin Fan. 25 Jul 79, 12p Rept no. FTD-ID(RS)T-0993-79
Edited trans. of Hang K'ung Chih Shih (China) n4 p33-35 1978.

No abstract available.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A079 906/4 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Computer Simulation of a Solar Energy System Which Utilizes Flat-Plate Solar Collectors.
Master's thesis,
Barry Eugene Prins. Dec 79, 102p Rept no. AFIT/GAE/AA/79D-15

This thesis is a computer simulation of a solar energy system that utilizes flat-plate solar collectors. By using available data from the U.S. Weather Bureau, the location and orientation of the collector, characteristics of the collector, and the type of storage and backup heat system in use, it is possible to find the amount of solar energy collected and transferred to storage. A life cycle cost analysis can be accomplished by using financial data and an inflation-discount function to reduce all costs to present year dollars. By varying any of a number of parameters the operator can determine what effect it has on the amount of energy collected and the life cycle costs. Results of running the program for a solar water heater system indicate that such a system is cost effective, when compared to a gas water heater system, only when the federal and state tax incentives were taken into account. However, electricity is approximately three times as expensive as gas per BTU of energy gained so the solar energy system is economically feasible when compared to an electric water heating system. (Author)

AD-A080 048/2 PC **A04**/MF **A01**
Solar Turbines International San Diego CA
Combined Cycle Steam Generator Gas Side Fouling Evaluation. Phase 1.
Final rept.
P. B. Roberts, and A. J. Kubasco. Jul 79, 51p Rept no. SR79-R-4557-20
Contract N00024-77-C-4366

Liquid-fueled gas turbines can produce serious steam generator fouling in gas turbine combined cycle applications and other waste heat recovery systems as a result of combustion system generated soot particles. In addition, standard soot blowing practices are not always compatible with the advanced, compact matrix designs sometimes required for minimum package size applications. This report describes an experimental program conducted on both test rigs and engine hardware designed to evalaute the effects on gas side soot fouling rates of various operational parameters such as soot loading, temperature and velocity. Particular attention was given to the effectiveness of the self-cleaning concept where elevated steam generator metal temperatures are utilized to remove soot deposits. The test results showed that a combustion rig can simulate the soot fouling rates and the type of soot encountered in a combined cycle gas turbine steam generator if duplication of the controlling parameters is achieved. In addition, self-cleaning by dry operation appears to be a viable alternative to air or steam blowing although further work is recommended in this area to see if the threshold temperature can be depressed or the rate of cleaning increased. (Author)

AD-B007 816/2 PC **A09**/MF **A01**
Little (Arthur D) Inc Cambridge Mass
Development of a Temperature Controller for a Vuilleumier (VM) Cycle Power Cylinder.
Final rept. 1 Sep 74-1 Oct 75,
Richard H. Spencer. Oct 75, 188p AFFDL-TR-75-99
Contract F33615-75-C-3002
Distribution limitation now removed.

Development of a temperature controller for the hot end of a Vuilleumier (VM) cryogenic cooler system is presented. The objectives of a low-cost, moderate reliability, environmentally tested controller are met in the design presented. Fundamental design factors include: use of an on/off controller operating from the 28-volt aircraft bus, use of a platinum resistance temperature sensor, packaging within 25 cubic inches, use of class P components, and an estimated mean-time-between-failure of more than 8000 hours.

N80-16485/8 PC **A03**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Prototype Solar Heating and Combined Heating Cooling Systems.
2 Oct 78, 44p NASA-CR-161340, QR-9
Contract NAS8-32092
Subm-Sponsored in Part by Doe.

The design and development of eight prototype solar heating and combined heating and cooling systems are discussed. The program management and systems engineering are reported, and operational test sites are identified.

N80-16576/4 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Cooling Tower Water Conditioning Study.
M. F. Humphrey, and K. R. French. 15 Dec 79, 44p NASA-CR-162691, JPL-PUB-79-104
Contract NAS7-100

Successful elimination of cooling tower treatment chemicals was demonstrated. Three towers functioned for long periods of time with ozone as the only treatment for the water. The water in the systems was reused as much as 30 times (cycles of concentration) without deleterious effects to the heat exchangers. Actual system blow-down was eliminated and the only makeup water added was that required to replace the evaporation and mist entrainment losses. Minimum water savings alone are approximately 75.1 1/kg/year. Cost estimates indicate that a savings of 55 percent was obtained on the systems using ozone. A major problem experienced in the use of ozone for cooling tower applications was the difficulty of accurate concentration measurements. The ability to control the operational characteristics relies on easily and accurately determined concentration levels. Present methods of detection are subject to inaccuracies because of interfering materials and the rapid destruction of the ozone.

PAT-APPL-6-074 844 PC **A02**/MF **A01**
Department of the Navy Washington DC
Heat Exchanger for Contaminated Water.
Patent Application,
Claude F. Manley, James P. Hersey, John H. Pennella, Donald J. Deaton, and Alan L. Grandall. Filed 7 Sep 79, 12p AD-D006 816/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A heat exchanger for cooling contaminated liquids causing precipitation of solid matter on cold walls. Waste water at high temperature containing contaminants in the form of sludge and in solution is pumped through the annular space between two concentric cylindrical tanks. Cooling water is circulated through the tanks on either side of the annular space while scraping devices rotate about the annular space preventing buildup of precipitate on the annular space walls. (Author)

PB80-127053 PC **A04**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Civil Engineering.
Snow and Ice Accumulation Around Solar Collector Installations.
Final rept.,
Michael J. O'Rourke. Aug 79, 75p NBS-GCR-79-180
Contract NB79-NAAA-6099
See also P80-113749. Sponsored in part by Department of Energy, Washington, DC.

Half the installations had the collectors mounted flush with the roof surface, while the remainder had collectors mounted on racks at an angle to the roof. Contours of snow depth on the roof, snow densities, measurements of snow on the ground adjacent to the buildings, sketches and photographs of the roofs, and comments of the owners of the installations are included in the report, in addition to a discussion of the state of the art of predicting snow accumulation on roofs of buildings. The effect of solar collectors on the design of roof structures for the support of snow loads is discussed and recommendations for future research are made.

PB80-128002 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Energy Research Center.
Weatherization Training: A Handbook for Weatherization. Urban Energy Programs. Supplement Number 5,
Jeffery Crause, Arthur Levy, and Allen L. White. Aug 79, 32p SRC-TR-77-555.25, CSA/LN-2427
Grant CSA-30200-L-76-01
See also Supplement No. 4, PB80-106172.

Topics included in this report are problems in urban weatherization programs with suggested solutions, the elements of a wood heat program, and the development of energy-related enterprises from the experience being gained by Community Action Agencies in weatherization activities.

PB80-128010 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Energy Research Center.
Wood Heat Programs,
Arthur Levy. Aug 79, 25p SRC-TR-77-555.26
Grant CSA-30200-L-76-01
See also Supplement no. 5, PB80-128002.

Wood heat and the use of well-designed, well-placed wood stoves are considerable difference in the cost of dissussed.

PB80-128028 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Energy Research Center.
Development of Weatherization and Energy Enterprises for Community Action Agencies,
Allen L. White. Aug 79, 19p SRC-TR-77-555.27
Grant CSA-30200-L-76-01
See also PB80-128010.

This report will assist community action agency (CAA) programs to capitalize on the demand for weatherization through the formation of energy-related enterprises which employ weatherization workers and serve local consumer markets. The discussion focuses on CAA involvement in the organization of energy businesses which may operate either within the agency or independently with initial CAA support.

PB80-131493 PC **A02**/MF **A01**
All Corp., Cockeysville, MD.
Solar Heating Experiment at Timonium Elementary School.
Mar 74, 18p AAI-ER-7802, NSF/RA/N-74-440

The Timonium School demonstration project aims to prove that, by using solar heating, the amount of fuel oil required to heat school buildings can be reduced by more than half. Timonium School was chosen as a pilot model because it is representative of many U.S. schools. Diagrams and photographs of the solar heating system are included.

PB80-131899 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
A Swedish Solar Heating Plant with Seasonal Storage: The Ingelstad Project - Design and Construction Stage,
Lennart Finn. 1979, 72p ISBN-91-540-3119-2, D14:1979

This report describes a solar heating plant connected to a newly-built residential area, consisting of 52 single-family houses in Ingelstad. The most important problems to be investigated in this project are how higher-temperature solar collectors (i.e. operating at higher temperatures than ordinary flat plate solar collectors) can be utilized for systems incorporating seasonal storage of solar energy, and how the design and choice of materials in the heat store are affected when water at a temperature near that of boiling is used as the heat storage medium.

PB80-132491 PC **A05**/MF **A01**
Cornell Univ., Ithaca, NY. Coll. of Engineering.
Influences of Component Cost Changes on the Optimum Design of Large Natural Draft Dry Cooling Systems,
Chukwuka C. Ndubizu. Aug 76, 80p EPR-76-3, NSF/RA-761815
Grants NSF-GI-34776, NSF-ENG76-02516

Various cost components of a large natural draft dry cooling system are identified: tower, heat exchanger, headers, condenser, pumps, auxiliary power loss, and cost due to high heat rate. An analysis is presented for heat exchanger area, tower exit area, and exchanger tube length and number, for a system using spine-fin heat exchanger. Calculations are made over a range of design parameters, but four of these parameters (approach, water pumping power, ITD, and heat rejection rate) are chosen for the economic optimization of the entire system. The headers, condensers, and pumps are sized. The auxiliary power loss and effects of high heat rate are determined. The various cost components are summed up to obtain the total cost of the cooling system in terms of the four chosen parameters and the various cost coefficients. The total cost of the system is optimized with respect to the four chosen parameters. A sensitivity analysis is carried out by determining the effect on the optimum cost of independently varying each of the cost components. The result is a ranking of the components in terms of how much improvement could be made in the overall cost of the cooling system by an improvement of each of the various components.

PB80-132772 Not available NTIS
National Bureau of Standards, Washington, DC.
Anomalous Cooling Power of Dilution Refrigerators and the Heat of Transport of He3 - He4 Solutions.
Final rept.,
E. Polturak, R. Rosenbaum, and R. J. Soulen, Jr. Dec 79, 10p
Sponsored in part by Israel Commission for Basic Research United States--Israel Binational Science Foundation, Jerusalem.
Pub. in Cryogenics 19, n12, p715-724, Dec 79.

The experimental cooling power of a dilution refrigerator employing two mixing chambers was found to exceed the theoretical cooling power by as much as 50%: with a single mixing chamber the experimental cooling power exceeded the theoretical value by 15%. This excess cooling power is explained by assuming that the He3 flow is partially diffusive. Information concerning the thermal diffusion ratio and the He3 relaxation time in a He(3)-He(4) solution is extracted from the data.

PB80-132871 PC **A05**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Development of a Honeycomb Covered Flat-Plate Solar Collector.
Quarterly progress rept. no. 2, 1 Dec 74-1 Mar 75,
K. N. Marshall, R. K. Wedel, and G. A. Bell. Mar 75, 91p LMSC-D409628, NSF-RA-N-75-470
Contract NSF-C956

Specifications were completed on the Mylar, Tedlar, Lexan, Kapton, and Teflon plastic honeycombs and procurement was initiated with Hexcel Corporation for honeycomb test specimens. Thermal radiation properties of individual films, representing the honeycomb materials, were measured in the laboratory to characterize the actual test materials and to calculate the effective solar transmittance and infrared emittance of the honeycomb sections. Optical measurements were made to evaluate the effects of candidate honeycomb adhesives on solar transmission and the best performing adhesives were selected for honeycomb applications. Special test instrumentation was designed and fabricated providing a unique capability for screening potential honeycomb systems without incurring a costly collector test program. A prototype honeycomb collector was designed and constructed for performance evaluation in the Lockheed outdoor solar collector test facility.

PB80-134661 PC **A04**/MF **A01**
Sibley School of Mechanical and Aerospace Engineering, Ithaca, NY.
Large Dry Cooling Towers with Spine-Fin Heat Exchange Elements,
F. K. Moore, and C. C. Ndubizu. Jun 75, 74p EPR-75-7, NSF-RA-N-75-483
Grant NSF-GI-34776

An analysis is presented for heat exchanger area, tower exit area, and exchanger tube length and number, for heat exchangers in large dry cooling towers, under very general cooling-cycle constraints. The calculation method is used to show that the 'spine-fin' heat exchanger, in a tube size of about 3/8 in., has excellent prospects for achieving low tower size in a practical device. Calculations, over ranges of water pumping power, approach, ITD, number of passes, tube size, tower shape (natural draft) or fan power (mechanical draft), and ambient pressure altitude are shown to be well represented by a chain of powers of these variables, and certain functions of the ratio of real to ideal tower exit area. This ratio is shown to have a best value, depending on the cost coefficients of heat exchange and exit areas.

PB80-136922 MF **A01**
Technology and Economics, Inc., Cambridge, MA.
Energy-Wise Homebuyer. A Guide to Selecting an Energy-Efficient Home.
Peter T. Hogarth, David J. MacFadyen, and Frank Spain. Mar 79, 60p HUD-0000845, HUD/PDR-412
Contract HUD-H-2648
Paper copy available from the Sup. of Docs., Stock number 023-000-00518-2.

A home buying guide for energy - conscious consumers, this booklet helps purchasers of both new and existing homes to assess the energy efficiency of a structure and enhance the home's features to improve energy conservation. Twelve features are focused on including proper levels of insulation in ceilings, attics, and walls; caulking and weatherstripping of windows and doors; storm windows and doors; type of heating system; heat pumps; air conditioning units with high energy - efficient ratios; ducts and pipes located in the heated space of a home; quality installation of insulation; clock and individual room thermostats; proper house orientation and shading of windows; band joist insulation; and outside combustion air intakes for furnaces and fireplaces. The booklet aids consumers in knowing the appropriateness of these features for their climate, home type, and fuel needs. It provides checklists indicating whether the features are essential or desirable, whether they require installation at the time the house is built or can be added later, and whether they are relatively inexpensive and easy to install or are costly or require professional installation. An energy checklist is also provided allowing consumers to record past energy bills in order to ascertain their energy efficiency and identify areas for improvement. Additional information on energy saving maintenance, low - priced and moderate - priced features to enhance energy conservation, and a detailed reference list of home energy efficiency features complete the booklet. A glossary of terms, a bibliography, and an index are provided. The booklet is illustrated.

PB80-140536 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Fire Experiments and Flash Point Criteria for Solar Heat Transfer Liquids.
Final rept.,
B. T. Lee, and W. D. Walton. Nov 79, 42p NBSIR-79-1931
Sponsored in part by Department of Energy, Washington, DC.

To help provide a rational basis for developing flammability criteria for heat transfer fluids used in solar energy collection systems, fire tests were performed using simulated accident scenarios involving spills, flowing leaks, spray leaks, and soaked insulation. These experiments indicated that the flash point temperatures, as measured with the Pensky-Martens closed cup apparatus, are close to the minimum temperatures at which pools of the fluids will support a flame when they are exposed to a small pilot igniting flame in a room. The heat release from moderate sized burning pools of these liquids is sufficient to cause flashover in a room. Interim flash point criteria of at least 28 deg C (50 deg F) greater than the maximum operating temperature and not more than 111 deg C (200 deg F) below the maximum no-flow temperature are proposed to reduce the risk of fire in the use of solar heat transfer liquids.

PB80-148273 MF **A01**
Versar, Inc., Springfield, VA.
Comparison of Model Predictions and Consumptive Water Use of Closed Cycle Cooling Systems.
Final rept. Mar-Jul 78,
Jerome B. Strauss. Nov 78, 207p EPA-600/7-78-206
Contract EPA-68-02-2618
Available in microfiche only because of poor quality.

The report gives results of a comparison of field-data-derived water evaporation rates with predictive model values for cooling towers and cooling ponds at steam-electric generating plants. The Leung Moore cooling tower model and five cooling pond models (Harbeck and Marciano; Harbeck; Harbeck, Koberg, and Hughes; Meyer; and Brady et al.) were used in the study. Plant data from 13 utilities (16 cooling tower systems and 7 cooling ponds) and for 5 water resource regions were utilized. For the water resource regions included in the study, ponds generally exhibited higher consumptive water use than towers.

PB80-805807 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Heat Pumps (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Audrey S. Hundemann. Mar 80, 235p
Supersedes NTIS/PS-79/0232 and NTIS/PS-78/0165. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-79/0233 and PB80-805815.

Technical and economic feasibility of extracting heat from one temperature source and delivering the thermal energy extracted for use at a higher temperature is discussed in abstracts of Federally-sponsored research. Air to air, air to water, and water to water heat pump systems are covered with reference to residential, commercial, and industrial applications. Performance and reliability studies of heat pumps, including solar assisted heat pumps, for residential heating are emphasized. (This updated bibliography contains 228 abstracts, 53 of which are new entries to the previous edition.)

PB80-805815 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Heat Pumps. Volume 2. 1978-February, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-Feb 80,
Audrey S. Hundemann. Mar 80, 167p
Supersedes NTIS/PS-79/0234 and NTIS/PS-78/0166. For the companion Published Search of the NTIS Data Base, see PB80-805897. See also Volume 1, 1970-1977, NTIS/PS-79/0233.

Design, performance, and applications of heat pumps are discussed in abstracts from worldwide literature. The heat pumps, which extract heat from one temperature source and deliver the extracted heat for use at a higher temperature, are discussed with regard to their energy conserving potential in residential, commercial, and industrial applications. Air to air to water, and water to water heat pump systems are covered. The use of heat pumps, including solar assisted heat pumps, in heating and cooling of buildings and heating of swimming pools is emphasized. (This updated bibliography contains 160 abstracts, 47 of which are new entries to the previous edition.)

13B. Civil Engineering

AD-A079 555/9 PC **A15**/MF **A01**
Sri International Menlo Park CA
User Guide for the Air Force Base Automotive Transportation Simulation Model - BATS. Volume 2. Documentation.
Final rept. Jun 78-Sep 79,
Richard Sandys. Sep 79, 348p AFESC/ESL-TR-79-16-VOL-2
Contract F08635-76-D-0132
See also Volume 3, Appendices D-E, AD-A079 556.

The Base Automotive Transportation Simulation (BATS) Model is a transportation planning and traffic flow model designed to simulate traffic volumes and flows on an air base. The principal model inputs are a road network, land use zones, demographic varibles, and gate counts. The land use zones and demographic variables are used to assign volumes to the road network, and these volumes are calibrated using the gate counts. The flow characteristics on each road in the network are simulated using the volumes assigned. Average speed and volumes are the results of the model and these may be directly input to the Air Quality Assessment Model (AQAM) to estimate pollutant emissions and dispersion from traffic sources. A volume flow plot of the network is an optional output of the model. (Author)

AD-A079 556/7 PC **A10**/MF **A01**
SRI International Menlo Park CA
User Guide for the Air Force Base Automotive Transportation Simulation Model - BATS. Volume 3. Documentation, Appendices D and E.
Final rept. Jun 78-Sep 79,
Richard Sandys. Sep 79, 223p AFESC/ESL-TR-79-16-VOL-3
Contract F08635-76-D-0132
See also Volume 1, AD-A079 326.

For abstract see AD-A079 555.

AD-A079 584/9 PC **A02**/MF **A01**
Coast Guard Washington DC Oceanographic Unit
Results of the Coast Guard's Tarball Sampling Program.
Technical rept.,
Carl K. Anderson, and J. L. Shuhy. May 79, 12p
Rept no. CGOU-TR-79-2

The U.S. Coast Guard has been conducting a tarball sampling program since December 1971 and to date over 1000 tows have been made. These tows have been made in the North Atlantic Ocean, the Labrador Sea, Gulf of Mexico, North Pacific Ocean, Bering Sea and the Gulf of Alaska. In general, low tar concentrations are found in the polar area, the average concentration being less than 0.03 mg/ sq. m., and can probably be attributed to the small number of natural seeps and limited amount of man's activities in these areas. High average concentrations (greater than 1.65 mg/ sq. m.) were found in the North Atlantic and North Pacific Oceans and the Gulf of Mexico where man's activities in the form of both drilling and shipping are greater. (Author)

AD-A079 639/1 PC **A14**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Land Management Alternatives in the Lake Erie Drainage Basin.
Final rept.
Mar 79, 317p
Report on Lake Erie Wastewater Management Study.

Previous studies have shown that diffuse sources of phosphorus must be managed if the trophic status of Lake Erie is to be reduced (LEWMS, 1975, 1979). Agriculture, in particular, cropland, is a predominant land use and contributor of diffuse source sediment and associated phosphorus to Lake Erie. This paper examines the values of potential gross erosion for six land management alternatives with special interest in present cropping practices, popular and common practices, and other alternatives which show promise for reducing sediment and phosphorus inputs. This report first describes the land management alternatives under consideration followed by the method employed in computing values of potential gross erosion. Finally, the potential gross erosion values of several watersheds will be examined. (Author)

AD-A079 667/2 PC **A04**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Application of the Universal Soil Loss Equation in the Lake Erie Drainage Basin.
Final rept.,
Donald R. Urban, Terry J. Logan, and John R. Adams. Nov 78, 52p
Report on Lake Erie Wastewater Management Study.

This report described the procedures used to determine potential gross erosion (PGE) in the U. S. portion of the Lake Erie drainage basin. The Universal Soil Loss Equation (USLE) was used in conjunction with the LEWMS-developed Land Resources Information System (LRIS) to determine gross erosion in the basin under existing conditions, and to evaluate the effect on gross erosion of several crop management options. These options included: reduce all soil losses to T (soil loss tollerance value), ban fall plowing, use winter cover crop, reduce tillage (chisel plow, disc, etc.), and conservation tillage (no-till on better-drained soils, chisel plow on soils with intermediate drainage). The report describes development of the USLE variables and gives samples of the output which is published as an appendix to this report. (Author)

AD-A079 668/0 PC **A13**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Environmental Statement, Oswego Steam Station, Unit Six.
Final rept.,
Paul G. Leuchner. 29 Mar 73, 285p

A detailed analysis of the environmental impacts related to the construction and operation of an oil-fueled electric generating station. The proposed unit will be constructed on a 91 acre tract along the south shore of Lake Ontario in the City of Oswego, Oswego County, New York. There are several steam electric generating units already in operation at this location. Steam produced by the proposed unit will be used to generate approximately 816 megawatts of electrical power. The water intake and effluent discharge system will be located in Lake Ontario. Approximately nine million barrels of fuel oil will be consumed annually. (Author)

AD-A079 676/3 MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Environmental Statement, Lake City Station, Unit One.
Final rept.,
Paul G. Leuchner. 17 Sep 73, 309p
Availability: Microfiche copies only.

A detailed analysis of the environmental impacts related to the construction and operation of an oil-fueled electric generating station. The proposed plant will occupy a 639 acre site on the south shore of Lake Erie in Girard Township, Erie County, Pennsylvania. Electrical power generated by this facility will vary between 245 megawatts and 295 megawatts. The water intake and effluent discharge system will be located in Lake Erie. Approximately 1.4 million barrels of No. 2 fuel oil will be consumed annually. (Author)

AD-A079 686/2 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Weir Jetties - Their Continuing Evolution,
Neill E. Parker. 1979, 6p Rept no. CERC-REPRINT-79-14
Pub. in Shore and Beach, p15-19 Oct 79.

No abstract available.

AD-A079 693/8 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Structures Lab
Earthquake Analysis of the Modified Geometry of the Concrete Nonoverflow Section Richard B. Russell Dam.
Final rept. Dec 78-Sep 79,
Charles Dean Norman. Nov 79, 45p Rept no. WES/TR/SL-79-14

Finite element computer analyses were performed for the modified geometry of the nonoverflow section of the Richard B. Russell Dam. Input for these analyses were synthetic earthquake records whose response spectra bounded the project design spectra prescribed by the Nuclear Regulatory Commission (NRC) Guide 1.60 at 0.25-g ground acceleration. Also the effects of variation in the elastic modulus of the concrete were studied using scaled time histories from the Helena and San Fernando earthquakes. A comparison of the results from these analyses is made with the actual earthquake experience at Koyna Dam in India. Acceleration, velocity, and displacement time histories along with the associated response spectra are presented in Appendix A. (Author)

AD-A079 714/2 PC **A11**/MF **A01**
Seaward International Inc Falls Church VA
Oil Pollution Response Planning Guide for Extreme Weather.
16 Nov 79, 238p USCG-D-3-80
Contract DOT-CG-80372-A

This Guide is intended to provide the On-Scene Coordinator with information and guidance useful in developing action plans and contigency plans for conducting oil pollution response operations in open water. The Guide considers two general categories of response operations at sea: (1) Prevention of (further) spillage from tanker and other vessel casualties. (2) Oil spill mitigation and cleanup. The following types of information are presented in the guide: (1) Outlines for Action Plans. (2) Planning guidance. (3) Requirements for initial casulty assessment. (4) Roles of ship's master, Salvor, other key personnel. (5) Description of response system and equipment options. (6) Data needs for use in selecting appropriate response approach. (7) Selection criteria for deciding between alternative response approaches. (8) Checklists for various types of the response operations. and (9) Sources for additional information. (Author)

AD-A079 786/0 MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Environmental Statement. Oswego Steam Station. Unit 5.
Final rept.
27 Dec 71, 222p
Availability: Microfiche copies only.

The Oswego Steam Station of the Niagara Mohawk Power Corporation occupies a site containing approximately 91 acres in the City of Oswego, New York, on the shore of Lake Ontario. This site now contains four fossil fuel steam electric generating units with a total nameplate rating of 320 megawatts (Mw) and a maximum output of 407 Mw. These units were constructed during the period from 1938 to 1956, and were designed for coal firing. Beginning in June 1972, these existing units will be fired with oil. The existing units utilize once-through cooling systems discharging to Oswego Harbor. Each utilizes its own smokestack discharging 365 ft above ground level. The proposed Unit 5 will consist of an oil-fired steam electric generating unit, with a nameplate ratring of 816 Mw and a maximum output of 890 Mw. The frontispiece of this report illustrates the southwest view of the expanded Oswego Steam Station. Detailed design and engineering work will be undertaken during the remaining three years for completion of the project.

AD-A079 834/8 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Operation of a 2000 Gallon per Day Reverse Osmosis Desalination System Aboard MONOB (YAG-61).
Research and development rept.,
Joseph F. Pizzino. Dec 79, 28p Rept no. DTNSRDC/PAS-79/30

A seawater reverse osmosis desalination plant rated for 2000 gallons per day output was installed and operated aboard the MONOB (YAG-61) for shipboard evaluation. The reverse osmosis plant produced 2200 to 3200 gallons per day of potable water when operated between pressures of 650 and 800 pounds per square inch gage, respectively. The diatomaceous earth prefilter performed reliably providing sufficiently high quality seawater filtrate to the reverse osmosis module. The overall reverse osmosis plant data after 480 operating hours showed no evidence of performance decline due to particulate fouling or calcium carbonate scaling. The reverse osmosis desalination plant power requirements aboard MONOB varied between 4.98 and 6.77 watt-hour per pound of freshwater produced. The fuel heat input requirements for a reverse osmosis plant were calculated to be 56 British thermal units per pound of freshwater for a ship that utilizes diesel electric generators, 91 British thermal units per pound for a ship that utilizes steam turbine generators, and 95.9 British thermal units per pound for a vessel that utilizes gas turbine generators. Procurement of a 12,000 gallon per day desalination plant is recommended along with a continuing technical effort on filtration and high-pressure pumps to achieve specific advanced performance goals. (Author)

AD-A079 887/6 PC **A04**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Ocean Dumping of Dredged Material at the Jacksonville Harbor Disposal Site: An Environmental Trend Assessment, February 1977 to April 1978.
Final rept.,
Brenda J. Little, and David K. young. Jun 79, 69p Rept no. NORDA-TN-42

The Biological and Chemical Oceanography Branch of the Naval Ocean Research and Development Activity conducted a three-phase study to assess the environmental effects of depositing 2,907,750 cubic yards of dredged material at the Jacksonville Harbor ocean disposal site designated for such purposes by the Environmental Protection Agency. Approximately 56% (1,637,000 cubic yards) of this material was dredged from the U.S. Naval Station, Mayport, FL. Distribution of dredged material at the disposal site was found to be both vertically and horizontally heterogeneous. Changes in bottom topography, coupled with significant increases of certain heavy metal (Ni, Cu, Pb, Zn, and Cr) within the disposal site, can be attributed to accumulation of dredged material during the period of investigation. A standard elutriate test indicated that heavy metals were bound to the Mayport dredged material and would not be readily released to the water column during disposal operations.

AD-A080 016/9 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab Fort Detrick MD
Evaluation of Ozone Oxidation and UV Degradation of Dimethylnitrosamine.
Technical rept. Sep-Nov 79,
Edmund A. Kobylinski, and Barry W. Peterman . Dec 79, 18p Rept no. USAMBRDL-TR-7908

Dimethylnitrosamine was detected in the wastewater leaving Holston Army ammunition Plant. The wastewater from the ammonia stripping column was treated with (1) ozone, (2) ultraviolet light, and (3) a combination of both ozone and ultraviolet light. Ozone alone does not degrade DMN. Ultraviolet degrades DMN yielding first-order kinetics with a rate constant of 1/0.025 min. A special run using UV was performed on the feed to the ammonia stripping column and it also yielded first-order kinetics with a rate constant of 1/0.044 min. (Author)

AD-A080 096/1 PC **A99**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Final Environmental Impact Statement Permit Application by New York State Electric and Gas Corporation. Proposed Cayuga Station Somerset, New York.
Final rept.,
Arthur K. Marks, Paul G. Leuchner, and Robert S. Rothman. Dec 78, 697p

This statement provides a detailed analysis of the environmental impacts associated withthe construction and operation of a coal-fired steam electric generating station. The proposed plant will occupy a 963 acre site on the south shore of Lake Ontario in the Town of Somerset, Niagara County, New York. Steam produced by this facility will be used to generate approximately 850 megawatts of electrical power. The water intake and effluent discharge system will be located in Lake Ontario. Approximately 1.9 to 2.2 million tons of coal will be consumed annually.

N80-16577/2 PC **A05**/MF **A01**
Columbia Univ., New York.
Research Plan for Establishing the Effects of Time Varying Noise Exposures on Community Annoyance and Acceptability.
P. N. Borsky. Jan 80, 99p NASA-CR-159197
Grant NSG-1616

The design of a community noise survey to determine the effects of time varying noise exposures in residential communities is presented. Complex physical and human variables involved in the health and welfare effects of environmental noise and the number-level tradeoffs and time of day penalties are among the factors considered. Emphasis is placed on community reactions where noise exposures are equal in day or evening but differ in the night time, and the effects of ambient noise on more intense aircraft noise exposures. Thirteen different times of day and types of operation situations with exposed populations up to 8-10 miles from the airport are identified. A detailed personal interview questionnaire as well as specific instructions to interviewers are included.

N80-16578/0 PC **A03**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Altitude Characteristics of Selected Air Quality Analyzers.
Final Report.
J. H. White, R. Strong, and J. B. Tommerdahl. Nov 79, 32p NASA-CR-159165, RTI/1833/00-03F
Contract NASA ORDER L-96783-A

The effects of altitude (pressure) on the operation and sensitivity of various air quality analyzers frequently flown on aircraft were analyzed. Two ozone analyzers were studied at altitudes from 600 to 7500 m and a nitrogen oxides chemiluminescence detector and a sulfur dioxide flame photometric detector were studied at altitudes from 600 to 3000 m. Calibration curves for altitude corrections to the sensitivuty of the instruments are presented along with discussion of observed instrument behavior.

PATENT-4 181 607 Not available NTIS
Department of the Interior, Washington, DC.
Removal of Asbestos Fibers from Water.
Patent,
Joseph E. Schiller, and Sanaa E. Khalafalla.
Filed 15 Sep 78, patented 1 Jan 80, 2p PB80-139256, PAT-APPL-942 846
Supersedes PB-292 209.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Asbestos fibers are removed from water by filtration through a bed of magnesium oxide.

PB80-126063 PC **A99**/MF **A01**
Geological Survey, Reston, VA. Office of Water Data Coordination.
Catalog of Information on Water Data. Index to Water-Data Acquisition. Volume I - Water Resources Region 03 (South Atlantic-Gulf).
1979, 686p

This report, Volume I is part of a 21-volume index to the Catalog of Information on Water Data. Each volume corresponds to one of the 21 water-resources regions of the United States. The index is a basic tool for the coordination and planning of water-data programs. The listings in each volume of the index are arranged according to four principal data categories. These categories are streamflow and stage, quality of surface water, quality of ground water, and areal investigations and miscellaneous activities.

PB80-127004 PC **A04**/MF **A01**
Environmental Design and Planning, Inc., Cambridge, MA.
Physical Chemical Treatment of a Combined Sewer Impacted Secondary Effluent.
Final rept. Mar 70-Nov 71,
Craig B. Anderson, William C. Pisano, and Gerald L. Aronson. Jan 80, 57p EPA/600/2-80/035
Grant EPA-11010 EHI

Physical-chemical treatment of conventional biological secondary effluent for the removal of organic and inorganic pollutants is used and considered applicable in areas where secondary treatment alone is incapable of producing satisfactory effluent quality. This report describes the results of a pilot scale study performed at East Chicago, Indiana, in which an evaluation was made of the effectiveness of treating biological secondary effluent impacted by combined sewer and industrial wastes with lime coagulation, dual media filtration and activated carbon adsorption. The 2840 cu m/day (0.75MGD) physical-chemical wastewater treatment facility demonstrated the effectiveness of chemical coagulation, filtration, and activated carbon adsorption on a combined sewer and industrial waste impacted secondary effluent. The costs associated with the operation of the treatment processes were also studied. Treatment consisted of: the addition of cationic coagulants (calcium hydroxide and ferric chloride); two stage coagulation; solids contacting and high rate sedimentation; dual media filtration; pH adjustment; and granular activated carbon adsorption. The primary coagulant (calcium hydroxide) dosage generally ranged from 185 mg/l to 415 mg/l, while the secondary coagulant (ferric chloride) was added at the rate of 17 mg/l when in use.

PB80-128341 PC **A02**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Workshop on Primary Sulfate Emissions.
Journal article,
John S. Nader. Oct 78, 6p EPA/600/J-78-156
Pub. in Jnl. of Air Pollution Control Association, v28, n10, p1002-1005, Oct 78.

This article is a summary report on a workshop, Measurement Technology and Characterization of Primary Sulfur Oxides Emission from Combustion Sources. The objectives of the workshop were: to review and discuss current measurement methods and problem areas for sulfur oxides emission with attention focused on sulfuric acid, sulfates, and sulfur-bearing particulate matter; to review and discuss emission data from various combustion sources operating under different conditions which include various pollutant controls, fuel composition, excess boiler oxygen, etc.; to delineate and recommend areas in need of research and development effort. Scientists were invited to present the results of their studies on primary sulfate emissions. The 3-day workshop devoted one day to measurement technology, a second to characterization, and a third to critical assessment of the presented papers and development of summary working group reports on each half-day session of the initial 2 days. Thirty-one papers were presented by 29 participants on measurements and characterization. Four working group reports were developed and summarized in the last day. Highlights of the papers and reports are briefly reviewed. Workshop proceedings are available as an EPA publication.

PB80-128457 PC **A10**/MF **A01**
Tennessee Valley Authority, Chattanooga. Power Research Staff.
Design of a Monitoring Program for Ash Pond Effluents.
Final rept. May 75-Mar 79,
F. A. Miller, III, T. V. J. Chu, and R. J. Ruane. Nov 79, 207p PRS-41, EPA-600/7-79-236

The report describes a procedure for designing an effective monitoring program for fossil-fueled power plant ash pond effluents. Factors that influence effluent characteristics and are important in designing such a monitoring program were determined following a review of plant operating characteristics and ash pond effluent characteristics of TVA's fossil-fueled power plant system. A statistical procedure for determining the sampling frequency of chemical characteristics in ash pond effluents was then developed. Two ways to determine precision are described: Method 1 involves selecting a precision value to estimate the population mean within a given percentage; Method 2 involves calculating a precision value by subtracting an estimate of the population mean from either the ash pond effluent limitation established by EPA or a desirable water quality criterion. Method 2 gives the number of samples required to show that the effluent is in compliance with the effluent limitation or below the water quality criteria. The method chosen to compute the precision depends on the purpose of the monitoring program. The procedure was demonstrated for two TVA ash pond systems.

PB80-128655 PC **A09**/MF **A01**
Southern Research Inst., Birmingham, AL.
Assessment of Diesel Particulate Control: Filters, Scrubbers, and Precipitators.
Final rept. Mar-Jul 79,
M. G. Faulkner, E. B. Dismukes, J. R. McDonald, D. H. Pontius, and A. H. Dean. Oct 79, 177p SORI-EAS-79-564, 3858-14-FR, EPA/600/7-79/232A
Contract EPA-68-02-2610

The report discusses an investigation of three types of devices that might be used for the aftertreatment of diesel exhaust to lower particulate emissions from light-duty vehicles. The devices are filters, electrostatic precipitators (ESPs), and wet scrubbers. The conclusions reached are that filters and ESPs merit further consideration, but wet scrubbers do not. Wet scrubbers were eliminated from further consideration on the basis of excessive size, low efficiency, and excessive fluid loss by evaporation (assuming that water is the fluid of choice). Filters and ESPs, although appearing to offer significant potential, have possible disadvantages that can only be assessed experimentally. Prototype filters and electrostatic devices that appear worthy of experimental study are described.

PB80-128689 PC **A05**/MF **A01**
Radian Corp., Austin, TX.
Calcium Sulfite Crystal Sizing Studies.
Final rept.,
Larry O. Edwards. Aug 79, 97p EPA/600/7-79/192
Contract EPA-68-02-2608

The report describes a reliable experimental method that can be used routinely to determine the crystal size distribution function, a measure that is required for a mathematical representation of the nucleation and growth processes involved in the settling, dewatering, and disposal of calcium sulfite sludge from lime/limestone or dual alkali scrubbers, a major problem associated with coal burning. Optical and instrumental crystal sizing methods were compared and the merits of each discussed; Coulter counting is recommended.

PB80-128697 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Assessment of Diesel Particulate Control: Direct and Catalytic Oxidation.
Final rept. Mar-Jul 79,
M. J. Murphy, L. J. Hillenbrand, and D. A. Trayser. Oct 79, 33p EPA-600/7-79-232B
Contract EPA-68-02-2629

The report discusses the technology and potential for disposal of diesel particulate by oxidation. Relevant properties of typical diesel particulate are given; note is taken of the small size (on the order of 0.1 micrometer diameter) and the presence of a portion extractable with an organic solvent. Available reaction rate data is used to derive particle lifetimes at various temperatures; these exceed likely exhaust system residence times. The use of catalysts to increase oxidation rates and lower ignition temperatures is discussed. Small amounts of many metals are effective in increasing the rate of oxidation by 2 to 5 orders of magnitude. Chemical reactor theory is used to derive ignition and operational characteristics of trap/oxidizers. Note is also taken of the tendency of these devices to go rapidly from a cold unignited state to an ignited state close to the adiabatic flame temperature of the fuel. Design techniques to ameliorate undesirable temperature excursions are presented.

PB80-129802 PC **A03**/MF **A01**
Environmental Law Inst., Washington, DC.
Emerging Issues in Wetland/Floodplain Management. Summary - Report of a Technical Seminar Series.
Consultants rept.,
Jon A. Kusler. Sep 79, 47p

The report is a summary of proceedings and recommendations of a series of technical seminars conducted by the U.S. Water Resources Council. The problem areas and recommendations cover: wetland and floodplain mapping; techniques of evaluating wetlands values and hazards; integration and coordination of wetland and floodplain management efforts; criteria and procedures for processing of permits; Federal, State, local and private roles in wetlands and floodplain management; acquisition of areas in fee and lesser interests; and research and study needs.

PB80-130438 PC **A02**/MF **A01**
Federal Highway Administration, Washington, DC. Implementation Div.
Construction Zone Delineation (Raised Pavement Markers).
Summary rept.,
Charles W. Niessner. Jun 78, 25p FHWA-TS-78-222
Color illustrations reproduced in black and white.

The Implementation Division of the Office of Development initiated a series of projects to evaluate the effectiveness of raised pavement markers as a means of guiding traffic through construction zones. This Tech Share document summarizes the results of those projects. One of the major findings of this evaluation was that the raised reflective pavement markers provide positive daylight and nightime guidance through both wet and dry periods. The additional safety, improved operations, reduced vandalism and unanimous favor by the public, Government and construction personnel justify their expanded use. The use of raised reflective pavement markers on construction detours also indicates a trend toward reducing the number of accidents. From an economic standpoint the cost of markers and paint is equal to or less than the cost of paint striping and removal.

PB80-130453 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden).
Air Movements - The Dispersion of Pollution; Exploratory Tests Using IR Techniques,
Claes Allander, and Bengt Ljungqvist. 1979, 13p ISBN-91-540-3151-6, BYGGFORSKNINGEN-D16:1979

The dispersion of nitrous oxide was measured by an infrared technique. A heat screen was used as a radiation source, and the absorption of infrared radiation by nitrous oxide molecules (as determined from infrared photographs) provided information on pollutant dispersion.

PB80-130479 PC **A06**/MF **A01**
Pacific Consultants, Boston, MA.
Construction of Urban Rail Transit Systems: The Challenge of More Cost Effective Construction,
Roger W. Dewey. Sep 79, 106p DOT-TSC-UMTA-79, UMTA-MA-06-0100-79-7
Contract DOT-TSC-1526
Conference Proceedings Held at Williamsburg, Virginia on December 7-8, 1978.

The goal of the conference was to seek input from the construction community on improving the use of public funds and insight into identifying new ways to control and reduce cost of construction of urban rail transit systems in the United States. The conference was organized into four sections and addressed the following topics: Transportation Overview, Transit Assistance Program, Technology Development and Deployment, and Policy; Owners' Point of View, Designers' Point of View, and Contractors' Point of View; Insurance and Bonding, Value Engineering, Construction Management; and Management R&D Review, Technology R&D Review, and Test Sections.

PB80-130511 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Proceedings, Federal Workshop on Excavation Safety, September 19 and 20, 1978,
Lawrence A. Salomone, and Felix Y. Yokel. Dec 79, 118p NBSIR-79-1935

A two-day workshop was held to obtan opinions from knowledgeable people on tentative conclusions and recommendations of a NBS Study on excavation safety. The workshop agenda included a series of presentations on Tuesday, September 19, 1978 and a series of group discussions on Wednesday, September 20, 1978. The topic areas covered in the group discussions were: soil classification; acceptable measures to protect workers against death by caving of banks in trenches and excavations; and, role of the professional engineer and engineering guidelines. This report summarizes and synthesizes opinions expressed in these group discussions and presents comments provided by correspondence after the two-day workshop.

PB80-130727 PC **A14**/MF **A01**
Envirex, Inc., Milwaukee, WI. Environmental Sciences Div.
Screening/Flotation Treatment of Combined Sewer Overflows. Volume II: Full-Scale Operation, Racine, Wisconsin. Appendices.
Final rept.,
T. L. Meinholz, D. A. Gruber, R. A. Race, C. A. Hansen, and J. H. Moser. Dec 79, 325p EPA-600/2-79-106B
Grant EPA-S-800744
See also main report, Volume 2, PB80-130693.

This study involved the planning, design, construction and operation of a two-year evaluation period, of three full-scale demonstration systems for the treatment of storm generated discharges. As part of the evaluation, the quality of the receiving body was also monitored. Two of the systems, located at two major points of combined sewer overflow to the Root River in Racine, Wisconsin, employed screening/dissolved-air flotation to treat the overflow prior to discharge. The two systems had a combined capacity of 222,000 cu m/day (58.5 mgd). The third system utilized screening only for the treatment of urban stormwater, having a capacity of 14,800 cu m/day (3.9 mgd).

PB80-130891 PC **A19**/MF **A01**
Research Corp. of New England, Wethersfield, CT.
Symposium on Fugitive Emissions Measurement and Control (3rd), Held at San Francisco, California on October 23-25, 1978.
Proceedings rept.,
J. King. Aug 79, 441p EPA-600/7-79-182
Contract EPA-68-02-2615

The proceedings are a compilation of technical papers prepared for presentation at the Third Symposium on Fugitive Emissions, October 23-25, 1978, at San Francisco, CA. The papers discuss the scope and impact of fugitive emissions (nonpoint sources) and present techniques which have been used to measure the emissions. Fugitive emission control technologies are also discussed.

PB80-131188 PC **A19**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Technical Assistance in Developing Nonattainment Plans for Selected Areas in California.
Final rept.,
James A. Throgmorton. Aug 79, 440p EPA-909/9-79-003
Contract EPA-68-02-2535
Prepared for California State Air Resources Board, Sacramento.

This report is intended to assist the California Air Resources Board by defining the nature, extent, and causes of violations of standards governing total suspended particulates in the air basins of the north coast, Sacramento Valley, San Joaquin Valley, and south central coast of the State and to

identify the potential means of eliminating these violations.

PB80-131584 PC **A16**/MF **A01**
Pullman Kellogg, Houston, TX.
Environmental Standards for Coal Conversion Processes. Volume II. Selected State, Mexican, and Canadian Regulations.
Final rept. Feb 77-Jan 79,
D. K. Webber, and D. E. Whittaker. Oct 79, 367p EPA-600/7-79-231B
Contract EPA-68-02-2198
See also PB80-126980.

The intent of this report is to provide those working in the engineering areas of multimedia environmental control an awareness of the types and breadth of regulations and criteria that have been and will be implemented. The information contains an engineering interpretation of some of the more stringent standards in the U.S., Canada, and Mexico. This is intended to aid process designers in their efforts to design environmentally improved facilities. The information is not intended to be a definitive summary or an exhaustive listing. Nor, is the report able to reflect accurately the current status of regulations because of on-going additions or changes.

PB80-131592 PC **A12**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
EPA Utility FGD Survey: July-September, 1979.
Quarterly rept. Jul-Sep 79,
M. Smith, and M. Melia. Oct 79, 270p EPA-600/7-79-022F
Contract EPA-68-01-4147
See also report dated Jul 79, PB80-122633.

The report is the last of three supplements updating the December 1978-January 1979 report (EPA-600/7-79-022c) and should be used in conjunction with it. The report was generated by a new computerized data base system and differs from those of the previous series in that the scope of design data for operating FGD systems is vastly expanded, section formats are revised somewhat, and a new section includes operational particulate scrubbers. The report gives a survey of utility flue gas desulfurization (FGD) systems in the U.S. It summarizes information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms. Systems are tabulated alphabetically by development status (operational, under construction, or in planning stages), utility company, process supplier, process, and waste disposal practice. It presents data on boiler design, FGD system design, fuel characteristics, and actual performance. It includes unit by unit dependability parameters and discusses problems and solutions associated with the boilers and the FGD systems. Process flow diagrams and FGD system economic data are appended to the report.

PB80-131832 PC **A04**/MF **A01**
Environmental Monitoring and Support Lab., Research Triangle Park, NC.
A Summary of the Interlaboratory Source Performance Surveys for EPA Reference Methods 6 and 7 - 1977.
Final rept.,
R. G. Fuerst, R. L. Denny, and M. R. Midgett. Aug 79, 61p EPA/600/4-79-045

This report summarizes the 1977 results of a source methods survey program conducted by the Quality Assurance Branch of the Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency. As part of these surveys, test solutions prepared as internal quality control samples were sent to interested participants in May and November for analysis by EPA Source Method 6 for SO2 and EPA Source Method 7 for NOx. Each participant returned the analytical results to the Quality Assurance Branch for evaluation; an individual report was returned to each participant after processing. This report contains a summary of the survey results for the analytical portion of these two source methods.

PB80-131840 PC **A05**/MF **A01**
JACA Corp., Fort Washington, PA.
Control of Air Emissions from Process Operations in the Rock Crushing Industry.
Rept. for 1977-78.
Feb 79, 97p EPA-340/1-79-002
Contract EPA-68-01-4135

Three basic methods of controlling emissions from process operations in crushed stone plants are described - dry captive systems using fabric filters, wet suppression systems, and combinations of these. Operational problems with these systems associated with plant portability and product size are discussed. Examples of good design practices and maintenance procedures for these control options are covered. An electrostatic charged fog technique for control of small dust particles is described and operational problems listed. A second part analyzes the downwind effects of reducing emissions for worker safety.

PB80-131964 PC **A06**/MF **A01**
TRW,Inc., Redondo Beach, CA.
Hazardous Material Incinerator Design Criteria.
Final rept.,
L. Manson, and S. Unger. Oct 79, 111p EPA-600/2-79-198
Contract EPA-68-03-2560

This report surveys commercial incineration facilities; characterizes four major types of incinerators - liquid injection, fluidized bed, rotary kiln and multiple hearth; and discusses how thermochemical properties of wastes affect their incineration and how application of thermochemical analysis of the wastes can be used.

PB80-132061 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Some Analytical Considerations Arising from Dynamic Tests on the Cleddau Bridge at Milford Haven,
R. W. Traill-Nash. c1978, 18p TRRL-SUPPLEMENTARY-418
Also pub. as ISSN-0305-1315.

Supplementary to dynamic tests on Cleddau Bridge at Milford Haven held in March 1975 an analysis was made to examine some aspects of the dynamics of the bridge. The model for analysis includes coupling of pier bending with bending of the superstructure box, and allows assessment of the effect of pier coupling both in natural vibration characteristics and in modal damping. Calculations were made of the theoretical response of the bridge under test loading, and a simulation was made of the acceleration response at measuring stations for comparison with recorded accelerometer outputs. The concept of damping the structure by viscous dampers at the supports of the suspended span was considered and damper requirements evaluated for the first two modes. Finally, in damping tests the integration of acceleration curves is considered for reducing distortion from higher mode responses, and the use of magnetic-tape recording is suggested. (Copyright (c) Crown Copyright 1978.)

PB80-132079 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Measurement of Groove Dimensions on Concrete Pavements by a Contactless Sensor,
P. B. Still. c1978, 19p TRRL-SUPPLEMENTARY-443
Also pub. as ISSN-0305-1315.

An optical displacement transducer, mounted on a vehicle-drawn trailer, has been applied to the measurement of groove depths and spacings on concrete pavements at speeds up to 10 km/h. The system uses the same equipment as that used to measure the texture depths of pavement surfaces. Various grooved surfaces were examined using the optical system and the results compared with depth-gauge measurements. The average groove depths measured by the contactless sensor are within 12 percent of the average depth-gauge reading, except for surfaces where the grooves are badly formed. The depths of perfectly formed grooves are measured to within plus or minus 0.6mm. The spacing between detected grooves is measured within plus or minus 2mm at a towing speed of 10 km/h. A programmed computer, mounted in the vehicle, performs the required calculations and allows the distribution of groove depths and spacings to be printed out on completion of each measurement. (Copyright (c) Crown Copyright 1978.)

PB80-132368 PC **A07**/MF **A01**
TRW Environmental Engineering Div., Redondo Beach, CA.
Preliminary Cost Estimates of Pollution Control Technologies for Geothermal Developments.
Final rept.,
R. Sung, G. Houser, G. Richard, J. Cotter, and P. Weller. Oct 79, 144p EPA-600/7-79-225
Contract EPA-68-03-2560

This report provides preliminary cost estimates of air and water pollution control technologies for geothermal energy conversion facilities. Costs for solid waste disposal are also estimated. The technologies examined include those for control of hydrogen sulfide emissions and for control of water discharges containing metals and inorganic dissolved solids.

PB80-132590 PC **A09**/MF **A01**
Ames, IA.
Evaluation of the Ames Solid Waste Recovery System. Part II: Performance of the Stoker Fired Steam Generators.
Interim rept. 5 Feb 76-4 Feb 77,
D. Van Meter, A. W. Joensen, W. L. Larsen, R. Reece, and J. L. Hall. Oct 79, 190p EPA-600/7-79-229
Grant EPA-R-803903010
Prepared in cooperation with Iowa State Univ., Ames. Engineering Research Inst., and Midwest Research Inst., Kansas City, MO. See also Part 1, PB-274 552 and Part 3, PB80-132608.

The report describes the thermodynamic and mechanical performance and corrosion evaluation of the stoker boilers while burning RDF as a supplemental fuel with coal. It can be stated that refuse derived fuel (RDF) may be successfully fired in these stoker boilers with no insurmountable problems.

PB80-132608 PC **A08**/MF **A01**
Ames, IA.
Evaluation of the Ames Solid Waste Recovery System. Part III: Environmental Emissions of the Stoker Fired Steam Generators.
Interim rept. 5 Feb 76-4 Feb 77,
J. L. Hall, A. W. Joensen, D. Van Meter, R. Wehage, and G. Severns. Oct 79, 152p EPA-600/7-79-222
Grant EPA-R-803903010
Prepared in cooperation with Iowa State Univ., Ames. Engineering Research Inst., Ames Lab., IA., Midwest Research Inst., Kansas City, MO. Sponsored in part by Contract W-7405-eng-82, Department of Energy, Washington, DC. See also Part 1, PB-274 552 and Part 2, PB80-132590.

The Ames Solid Waste Recovery System is a continuously operating system that is processing municipal solid waste for use as a supplemental fuel in the existing steam generators of the Ames Municipal Power Plant. The purpose of this report is to present results of the investigations of the environmental effects of using solid waste as a supplemental fuel. This report presents the results and conclusions of the first-year environmental emissions investigation on the two stoker-fired steam generator units when using coal and refuse derived fuel. Following sections of this report present a statement of the objectives, a summary of results, a description of the boilers, a description of the experimental design and the sampling methods used, and a presentation of the results. The results of the environmental investigations were analyzed statistically. This statistical study is presented in the Appendix.

PB80-132889 PC **A07**/MF **A01**
Tennessee Valley Authority, Chattanooga.
Chlorine Minimization/Optimization for Condensor Biofouling Control. Phases I and II.
Rept. for May 75-Sep 77,
R. D. Moss, H. B. Flora, II, R. A. Hiltunen, S. H. Magliente, and N. D. Moore. Aug 79, 129p EPA-600/7-79-198

The report summarizes results of a chlorine minimization/optimization study for the control of biofouling on the surface of condenser tubes at TVA's John Sevier Plant from December 1975 to September 1977. The required chlorine feed rate was found to be a function of inlet water temperature

and chlorine demand. Statistical analysis of the data did not indicate a significant impact of water quality parameters (pH, total suspended solids, ammonia, total organic carbon, nitrates plus nitrites, organic nitrogen, alkalinity, and conductivity) on the required feed rate. It was determined that inlet water temperature may be used as an indicator for raising or lowering the chlorine feed rate. Natural water and system chlorine consumption was found to vary directly with the chlorine feed rate and the inlet water temperature.

PB80-132996 PC **A10**/MF **A01**
De Leuw, Cather and Co., Washington, DC.
In-Service Performance and Costs of Methods to Control Urban Rail System Noise. Second Test Series Report.
Interim rept. Oct 77-Sep 78,
Hugh J. Saurenman. Oct 79, 202p DOT-TSC-UMTA-79-33, UMTA-MA-06-0099-79-4
Contract DOT-TSC-1053
See also PB-288 838, and PB-257 200. Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, CA.

The goal of the project is to provide sufficient information to allow a transit system with given track and car conditions and budgetary constraints to determine the mix of available noise control methods which will result in the greatest overall benefit. Included in this benefit evaluation is the reduction of noise radiated to adjacent communities and the reduction of patron noise exposure. This project is designed to provide information on both the long-term and short-term costs and effectiveness of various wheel/rail noise abatement procedures if implemented on typical urban rail systems in the United States. This interim report presents the results of the final four phases of a seven-phase test program to determine the acoustic and economic effectiveness of resilient wheels, damped wheels, wheel truing, and rail grinding for reducing wheel/rail noise on urban rail transit systems.

PB80-133150 PC **A10**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Analysis of Adoption and Implementation of Community Land Use Regulations for Floodplains.
Final rept.,
Janice R. Hutton, Dennis S. Mileti, William B. Lord, John H. Sorensen, and Marvin Waterstone. Oct 79, 216p NSF/RA-790278
Grant NSF-ENV77-13908

The study had two general objectives: (1) to develop a theory of local policy adoption and implementation which could ultimately enhance the adoption of local community land use controls for hazard mitigation and upgrade the implementation of those controls when adopted; (2) to extend the findings and to explain local adoption and implementation of land use mangement techniques. An exploratory study was conducted to develop a theoretical model which defined and explained policy adoption and implementation in local jurisdictions, and to develop a research design to test the model for land use controls on a representative national sample of flood-prone communities.

PB80-133218 PC **A02**/MF **A01**
Notre Dame Univ., IN. Dept. of Civil Engineering.
Application of Sequencing Batch Reactors for Treatment of Municipal and Industrial Wastewater.
Final rept. 11 Jul 76-30 Apr 79,
R. L. Irvine. Oct 79, 25p NSF/RA-790276
Grant NSF-PFR76-10381
See also PB-273 846.

Conventional wastewater treatment facilities operate in a continuous mode with little or no variation in the liquid levels of the tanks. This study investigates the value of intermittent operations, including marked variations in liquid levels within tanks, on the consistency and reliability of wastewater treatment. Considerations were limited to both small flow situations that are common to rural areas and unusual treatment problems such as the removal of priority pollutants. Desk top, computer, bench-scale, and pilot-scale studies were conducted under the periodic review of an Advisory Committee composed of potential users from both industry and government. A utilization plan was developed to disseminate the results as they became available through theses, publications, and presentations. Basic information with respect to sequencing batch reactor (SBR) design, operation, cost, research potential, and user areas was developed.

PB80-133812 PC **A04**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Transportation and the Environment.
Working paper,
Elaine M. Conley. May 79, 63p NTPSC/WP-79-14

The main purpose of the report is to identify major issues and concerns of transportation as they relate to environmental and safety goals. It is not designed to be a final, definitive review of all transportation-related environmental and safety issues throughout the nation; the intent is, rather, to serve as a framework for initiating, expanding, and focusing an awareness of those issues for policy decisionmaking and resolution. To this end a number of particularly important or timely issues in the context of transportation, the environment, and safety over the next 25 years are treated. Eight issues were selected according to several qualitative criteria, in consultation with experts in the field, Commission regional public hearings, and current literature. They were selected to represent a sampling of acute and chronic problems in the provision of transportation supply affecting all the modes.

PB80-133911 PC **A05**/MF **A01**
Oregon State Univ., Corvallis. Water Resources Research Inst.
Point and Non-Point Pollution Influencing Water Quality in a Rural Housing Community.
Completion rept.,
Ramon J. Seidler. Nov 79, 83p WRRI-64, W80-02708, OWRT-A-045-ORE(1)

The purpose of the report was to analyze the intensity and origin of non-point pollution in protected and unprotected regions of a rural watershed (Oak Creek watershed). The Oak Creek watershed covers an area of 750 ha. The upper (northern) part of the basin drains part of McDonald Forest, a 4450 ha State-owned forest which is undisturbed except for research activities. The lower (southern) part of the basin includes a rural community consisting of 78 homes. Numbers and species of fecal indicator bacteria were studied through the entire watershed. Also, the presence of the intestinal pathogen Salmonella was studied, since the relationship of numbers of indicators and presence of this pathogen do not strictly correlate. The impact of non-point pollution on ground waters serving as drinking water supplies in this modern rural development was studied.

PB80-134059 PC **A06**/MF **A01**
Allen County Soil and Water Conservation District, Fort Wayne, IN.
Environmental Impact of Land Use on Water Quality.
Final rept. 1972-77,
James B. Morrison. Nov 77, 112p EPA-905/9-77-007-D
Grant EPA-G-005103
See also PB-278 187. Report on 'Black Creek Sediment Control Project'.

The report is an addition to the Final Technical Report of the Black Creek sediment control project. This project is to determine the environmental impact of land use on water quality. The project, which is directed by the Allen County Soil and Water Conservation District, is an attempt to determine the role that agricultural pollutants play in the degradation of water quality in the Maumee River Basin and ultimately in Lake Erie.

PB80-134257 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Identification of Generic Study Areas for the Disposal of Low Level Radioactive Waste: Western North Atlantic Ocean.
Technical rept.,
Charles D. Hollister, Elizabeth T. Bunce, and Richard S. Chandler. Jul 79, 50p WHOI-79-82
Sponsored in part by Sandia Labs., Albuquerque, NM.

Two sites have been identified in the western North Atlantic as deserving further study as potential low level radioactive waste repositories. This study examines those two areas, one north of Puerto Rico and the other east of Cape Hatteras, because of various physical and geologial parameters, including topography, seismicity, sediment characteristics and deep water circulation. A detailed topographic analysis is offered based on seismic reflection studies and recommendations for confirmatory research are outlined for each site.

PB80-134273 PC **A03**/MF **A01**
Leisch (Jack E.) and Associates, Evanston, IL.
Study of Width Standards for State Aid Streets and Highways. Volume I: Executive Summary.
Jack E. Leisch, and Timothy R. Newman. Jul 79, 27p FHWA/MN-79/04
Sponsored in part by Minnesota Local Road Research Board, St. Paul. See also Volume 2, PB80-134281.

The study involved a multi-dimensional approach including a study of present professional practice, a historical review, and an evaluation of the safety, operational environmental and cost aspects of width elements. Variables considered include human factors responses, basic driver-vehicle-road relationships, system or network considerations, costs of construction and maintenance, and environmental impacts. The study enabled formal evaluation of all pertinent width elements, and recommendations concerning optimal values for input to Minnesota state aid design standards.

PB80-134281 PC **A12**/MF **A01**
Leisch (Jack E.) and Associates, Evanston, IL.
Study of Width Standards for State Aid Streets and Highways. Volume II: Research Report and Appendices,
Jack E. Leisch, and Timothy R. Newman. Jul 79, 275p FHWA/MN-79/05
Sponsored in part by Minnesota Local Road Research Board, St. Paul. See also Volume 1, PB80-134273.

The objective of the research was the collection, analysis and documentation of recent research concerning the safety, operational and cost aspects of roadway width elements.

PB80-134323 PC **A03**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Center.
A Simple Pollution Vulnerability Index for Preliminary Coastal Water Quality Management Planning.
Completion rept.,
Bruce J. Edwards, and Franklin E. Woodard. Oct 79, 32p W80-02768, OWRT-A-047-ME(1)

A quantitative pollution vulnerability index was developed for locating future coastal discharge in Maine so that deleterious effects are minimized. The index is designed to serve as a planning tool for agencies in coastal zone management. The vulnerability of a coastal zone is determined by its capacity to accept a particular pollutant which is a function of dispersion, background pollutant levels, and allowable limits. The Weyl 'pollution susceptibility index' is used because it is mathematically simple and requires minimal input data. Because levels of critical use are not well defined for a wide range of pollutants, fecal coliform is used for an example.

PB80-134638 PC **A02**/MF **A01**
Dynatherm Corp., Cockeysville, MD.
Augmentation of Earth Heating for Purposes of Roadway Deicing - Executive Summary.
Final rept. Jun 76-Dec 78,
M. F. Pravda, W. B. Bienert, D. A. Wolf, J. E. Nydahl, and K. M. Pell. Feb 79, 25p DTM-79-3, FHWA-RD-79-80
Contract DOT-FH-11-9169
See also report dated Dec 78, PB80-125990.

This report describes the results of a team effort to set forth the technology of thermal augmentation of earth heating systems and to identify the most cost effective renewable energy source to be used for this purpose. The unaugmented West Virginia earth heat pipe system, which has been in operation for 4 years, was selected as the reference design. A representative section of this design was

analytically modeled. The exchange of thermal energy between the pavement surface and the environment was described by a series of experimentally verified expressions. The environment was characterized by actual hourly weather data for the average and most severe years in three climate zones. A computer was employed to follow the hour by hour performance of the West Virginia design with and without augmentation throughout the year. The results of this computer analysis permitted the formulation of an engineering approach to the design of augmented and unaugmented earth heating systems.

PB80-134646 PC **A11**/MF **A01**
Skelly and Loy, Harrisburg, PA.
Study of Underground Coal Mine Waste Disposal Requirements in the United States.
Final rept. 30 Sep 77-30 Sep 78,
Walter W. Kaufman, and John R. Williams. 20 Oct 78, 250p BUMINES-OFR-6-80
Contract J0275037

This report summarizes a study conducted to establish the nature and impact of regulations governing disposal of refuse from underground coal mines. The regulations affecting refuse disposal in eight major coal producing States are collected, summarized, and reviewed. Federal regulations applicable to refuse generated by underground coal mines are also included. Common refuse disposal practices are discussed as are the refuse quantities generated annually in each study State. Technical requirements of regulations are discussed and presented in tables. Economic implications are also assessed through cost analyses of three major types of disposal processes. The report also includes an assessment of future trends in regulation and refuse generation plus a series of recommendations concerning potential improvements in both the regulatory and refuse disposal processes.

PB80-134687 PC **A04**/MF **A01**
Maine Univ. at Orono. Life Sciences and Agriculture Experiment Station.
Institutional Structures Affecting On-Site Waste Disposal in Maine.
Technical completion rept.,
Gregory K. White, and Joel D. Davis. Sep 79, 52p BULL-761, W80-02765, OWRT-A-046-ME(2)

Three main State-level agencies involved in sewage disposal regulations in Maine are the Land Use Regulation Commission; the Department of Environmental Protection (DEP); and the Department of Human Services, Division of Health Engineering. The Land Use Regulation Commission grants permits for the development of private sewage disposal systems to applicants who meet the requirements of the Maine Plumbing Code and who: (1) plan to build on tested suitable soil, (2) have the necessary financial ability, (3) have the necessary technical ability, and (4) plan to meet the minimum lot size standards. The DEP enforces water pollution control laws, licenses and monitors effluents, and assists in disposal planning. The Maine Plumbing Code is used as a regulatory device for land development. Some areas of the Code are discussed in detail along with various disposal alternatives that are permitted. A brief national sewage disposal perspective is also presented.

PB80-134802 PC **A07**/MF **A01**
Silling Associates, Inc., Charleston, WV.
Charleston Ordnance Center Expansion Study for the City of South Charleston, West Virginia.
Jan 80, 141p EDA-80-018
Grant EDA-01-06-01885
Prepared in cooperation with Rude and Associates, Inc., South Charleston, WV. and Skidmore, Owings and Merrill, Washington, DC.

The existing Army, Navy and Marine Corps Reserve Centers have been located in South Charleston since the 1940's and have become a vital part of the city life by providing economic growth and a community known as the center of reserve activities in southern West Virginia. Because of the positive impacts on the city provided by the Reserve Centers, the city is cooperating in every way to provide accommodations for the proposed conbined reserve centers. The reserve centers would serve as a structure to engender industrial expansion.

PB80-134976 PC **A08**/MF **A01**
Arizona Univ., Tucson. Office of Arid Lands Studies.
International Water Use Relations Along the Sonoran Desert Borderlands.
Information paper,
Milton H. Jamail, and Scott J. Ullery. 1979, 154p ARID LANDS RESOURCE-IP-14, W80-02766, OWRT-C-90004-W(9604)(1)
Contract DI-14-34-0001-9604
Color illustrations reproduced in black and white.

Water resources in the arid-semiarid region of the Sonoran Desert Borderlands are, and historically have been, difficult to manage due to the artificial political boundary between Mexico and the United States. The current state of water use relations in this area are examined from published and unpublished articles and manuscripts, government reports and hearings, press reports, first-hand observations, and interview with officials and other involved individuals. Water resources areas examined include international groundwater, surface water, and water pollution. The International Boundary and Water Commission (IBWC) is designed to deal with these issues, however, rapid urbanization along the border with its accompanying municipal and industrial water demands has created new conflict areas other than the long-standing conflict over agricultural water use. IBWC has a limited scope of authority and is inadequate in resolving issues where sound water management is secondary to political considerations.

PB80-135130 PC **A05**/MF **A01**
California Univ., Los Angeles. Dept. of Biology.
Aquacultural Approaches to Wastewater Nutrient Recycling.
Technical completion rept.,
M. S. Gordon, and D. J. Chapman. Jul 79, 79p W80-02764, OWRT-C-7052(6206)(1)
Contract DI-14-34-0001-6206

Five years of laboratory scale studies were conducted to access the potential of waste water aquaculture as a means of (1) developing a basis for a freshwater aquaculture industry in the U.S., (2) producing salable foods or other commodities to improve waste treatment plant economics, (3) reducing agricultural energy costs by eliminating fertilization needs, and (4) improving the quaity of waste treatment plant discharges. Sequential monocultures of waste water based food chains were investigated using algae, crustaceans, and fishes. All waste water used for the studies was fully secondarily treated, chlorinated, and dechlorinated. Results show that the use of artificial food chains for tertiary waste water treatment is feasible for the reduction of nutrient loading and for the production of valuable protein sources.

PB80-135163 Not available NTIS
Industrial Environmental Research Lab., Research Triangle Park, NC.
Application of High-Temperature Hyperfiltration to Unit Textile Processes for Direct Recycle,
C. A. Brandon, and Max Samfield. 1977, 16p EPA-600/J-78-154
Prepared in cooperation with Clemson Univ., SC. Dept. of Mechanical Engineering.
Pub. in Desalination v24 p97-112, 1978.

The paper gives results of an evaluation of high-temperature hyperfiltration for recycle of both water and chemicals in five operating textile manufacturing processes: an atmospheric dye beck, a pressure beck, an open-width preparation range, a dye range, and a rope preparation range. Reuse of the (hot) permeate has been demonstrated in every instance. Thus, up to 9 X 10 to the 13th power Btu/yr may be conserved in the U.S. textile industry by direct recycle of the hot wastewater. Control of toxic emissions by membranes was evaluated by examining data existing in the literature: a very limited amount of textile wastewater data indicates feasibility of control of organic compounds of moleculare weights = or > 90. The potential economic payout is good, with recovery of specific chemicals and energy being paramount. A conceptual layout for closed-cycle operation of a continuous range indicates that some chemicals in the waste and a majority of the energy can be conserved by recycling.

PB80-135270 PC **A04**/MF **A01**
Rockwell International, Newbury Park, CA. Air Monitoring Center.
Quality Assurance in Support of Energy Related Monitoring Activities.
Annual rept. no. 2,
Mark Cher. Jun 79, 69p AMC8303.135AR-2, EPA-600/7-79-136
Contract EPA-68-02-2412
See also report dated Sep 78, PB-291 789.

This report describes and summarizes the activities during the second year of a 5-year program. The purpose of the program is to establish a quality assurance data base for ambient air monitoring in specified geographical areas around present and proposed energy development projects, and to provide technical assistance to enable existing monitoring networks to achieve a high level of data quality. An initial on-site review of 18 laboratories and associated field sites was completed during the first year. Additional laboratories and field sites were evaluated during the second year. Regularly scheduled laboratory performance surveys are being carried out for the analysis of sulfate, nitrate, SO2, NO2, and CO and for weight measurements and high volume flow rate. Quarterly field audits are being conducted at specified monitoring sites.

PB80-135346 PC **A05**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC. Meteorology and Assessment Div.
The EPA Meteorological Wind Tunnel, Its Design, Construction, and Operating Characteristics.
Fluid modeling rept. no. 6, Jun 75-Dec 78,
William H. Snyder. Sep 79, 81p EPA-600/4-79-051

The design philosophy, construction details, and operating characteristics of the EPA Meteorological Wind Tunnel are described. Measurements in the empty tunnel show that the mean velocity is uniform to within plus or minus 2% at any given cross section, at speeds as low as 1.5 m/s. The turbulence intensity in the empty tunnel is typically 0.5%. A 2-meter-deep boundary layer was obtained using elliptic wedge v..rtex generators and roughness on the floor. Measurements are presented showing that this boundary layer simulates, in both turbulence structure and dispersive characteristics, a neutral atmosphere boundary layer over rural terrain.

PB80-135429 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Cycle Routes in Portsmouth. III-Attitude Surveys,
S. W. Quenault. c1979, 31p TRRL-LR-875
See also PB80-135437.

Between November 1975 and June 1976, a set of experimental cycle routes of a total length of 6.3 km were available for use in the City of Portsmouth. Attitude surveys carried out three and six months after the opening of the cycle routes indicated that most residents on the cycle routes considered that they had been unaffected by the scheme or were actively in favor of it. Most cyclists were in favor of the cycle routes, but there was much criticism from them of motorists ignoring traffic signs along the routes and of their lack of consideration for cyclists. About half of the 39 shopkeepers on the routes claimed that they had lost some trade since the opening of the routes. Most of the complaints made by a sample of motorists concerned the need to make detours in some of their journeys due to the layout of the special junctions on the route. Apart from meeting its design aims to a good measure, the cycle route experiment provided valuable information on the operation and monitoring of the cycle routes and attitudes to them which was used to good effect in the planning and monitoring of more advanced cycle routes in other cities in Britain. (Copyright (c) Crown Copyright 1979.)

PB80-135437 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Cycle Routes in Portsmouth. II-Traffic Studies,
F. J. Nicholson. c1979, 29p TRRL-LR-874
See also PB-279 118, and PB80-135429.

An experimental cycle route network was in operation in Portsmouth between November 1975 and June 1976. The routes were located on lightly-trafficked roads away from parallel major roads and a number of new traffic management techniques were employed to make them as safe and convenient for cyclists as possible in the circumstances. This Report presents the results of studies of the use of the routes as a whole and of the traffic management features in isolation. Although some motorists ignored the restrictions that were intended to limit the amount of motor traffic using the cycle routes, the overall effect of the experimental measures was to reduce motor vehicle flows to about two-fifths of their original levels. Cycle flows rose by about one-third. At least half of this increase was due to the experimental measures. No changes in the number of accidents involving cyclists on the routes could be detected during the experiment as the annual numbers of accidents before and during the experiment were low. (Copyright (c) Crown Copyright 1979.)

PB80-135593 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
Computer Program for Calculating the Performance of Urban Emergency Service Systems: User's Manual (Batch Processing) Program Version 75-001 (Batch).
Technical rept.,
Richard C. Larson. Mar 75, 131p TR-14-75, NSF-RA-S-75-140
Grant NSF-GI-38004

Use of a computer program written in PL/1 language to implement mathematical models for numerically evaluating certain performance characteristics of urban emergency service systems (e.g., police, medical and fire services) is described. The program is in the public domain, making it available to anyone wishing to use it. The PL/1 program indicates the major needs of the user community based on its use in certain M.I.T. courses and in two greater Boston area communities. The user's manual contains the following sections: (1) reviews of model assumptions, data requirements, and outputs; (2) outlines of illustrative applications of the models; (3) illustrations of a basic sample run without using any of the advanced features of the computer program; (4) details of all of the options that are included to facilitate implementation in complex urban environments; (5) definitions and conventions used in certain complicated situations such as those involving overlapping districts; and (6) a concise, technical summary of program use.

PB80-136609 PC **A04**/MF **A01**
Durham Urban Observatory, NC.
Comprehensive Statistical Survey.
John B. McConahay. Mar 77, 67p HUD-0000671

Results of a survey conducted to accommodate the research needs of the Durham Urban Observatory's second year research agenda are set forth in this document. A single, comprehensive survey was used to satisfy the needs and disparate projects dealing with such topics as citizen communication, resource recovery, citizens' perceptions of city government, respondents' interest in city government, and citizen receipt of information and their involvement in city activities. The purpose of the project was to insure maximum reliability and validity of the sampling and statistical efforts necessary for the second year projects. An ancillary purpose was to provide a joint activity for interaction of all project personnel. A telephone survey was implemented using the 1976 Durham County telephone directory and a table of random numbers. There were 433 completed interviews. The overall effectiveness of consolidating survey needs seemed to be valid, and close cooperation between the researchers conducting the survey and the researchers involved with the projects being serviced by the survey was shown to be crucial. The major project serviced by the comprehensive survey instrument involved effective communication by citizens and the media, and the results for this project were shown to be indispensable. The resource recovery project was also serviced well by the survey, and the secondary relationship of this project to the project on effective communication produced adequate but hardly spectacular results. The questions involving recognition of the Durham Urban Observatory Program were invalid, since, at the time of the survey, not a single Urban Observatory publication was available to the general public. It was also found that the citizens of Durham did not consider the faculty resources of either Duke University or North Carolina University to be of aid to the city of Durham in problem solving. Surprisingly, the first choice by many respondents (38.2 percent) was State or Federal sources (undefined). Private consultants were specified as a third choice for outside expertise. The codebook and questions used for the survey are included, as well as tables and discussions of the responses to the questions.

PB80-136955 PC **A03**/MF **A01**
Claremont Graduate School, CA.
Data Management Software: A USAC (United Information Systems Inter-Agency Committee) Concern.
Eugene Kozik, C. F. Davis, O. E. Dial, Kenneth L. Kraemer, and William H. Mitchel. 1972, 47p HUD-0000899

The overall goal of Integrated Municipal Information System (IMIS) data management software (DMS) is to develop an integral set of computer programs which can handle and store compactly great masses of municipal data from multisources and which will allow the user selected access to needed data. The data should be available instantly, correctly, and with great storage and retrieval freedom. A review of IMIS software in project cities finds that DMS packages are being built without sufficient performance measurement. The United Information Systems Inter - Agency Committee (USAC) recommends (1) that benchmark performance measurement techniques be developed for IMIS DMS packages, (2) that more realistic initial goals be set and more experimental simulation be used to develop software design knowledge, (3) that more attention be given to security and that a Computer Security Technology Panel be created, and (4) that project cities be put through a mismatch analysis to try to develop a common set of DMS operating characteristics. LINK, CLEAR, and Formatted File System (FFS) are workable public domain DMS packages which could be used in some USAC cities. A task force should investigate the use of these and other public domain DMS packages. The problem of searching large files on - line without the high cost of traditional file inversion techniques should be addressed. A virtual software using associative memories could be used. Each recommendation is discussed and documented.

PB80-136963 PC **A03**/MF **A01**
Claremont Men's Coll., CA.
Data Processing Dedication: A USAC (United Information Systems Inter-Agency Committee) Concern.
O. E. Dial, C. F. Davis, Eugene Kozik, Kenneth L. Kraemer, and William H. Mitchel. 1972, 40p HUD-0000900

The United Information Systems Inter - Agency Committee (USAC) approach to Integrated Municipal Information Systems (IMIS) requires that such systems be operated under centralized direction and that a data access control plan be used to ensure confidentiality of sensitive parts of the data base. The National Crime Information Center (NCIC), operated by the Federal Bureau of Investigation, provides a computer - based national criminal history index and network to States and selected cities, but specifies that all portions of the system, including the terminals, are to be used exclusively by criminal justice personnel. The NCIC system has a potential of 45,000 local, State, and Federal user terminals, many of which are target cities for IMIS. As the rules now stand, a city may not consistently participate in both programs. The NCIC recommendation is an outgrowth of work done by Project SEARCH (System for Electronic Analysis and Retrieval of Criminal Histories) funded by the Law Enforcement Assistance Administration. Project SEARCH concluded that criminal justice information must receive highest security priority and that the best way to maintain this security is through total dedication of a national criminal history network for the exclusive use of criminal justice agencies. The USAC approach attempts to bridge differences between governmental agencies through the sharing of data. The pros and cons of this debate are given. A shared system with strong security measures for sensitive data is recommended. Appendices contain background and position papers issued by NCIC.

PB80-136971 PC **A02**/MF **A01**
Claremont Graduate School, CA.
Data Standardization: A USAC (United Information Systems Inter-Agency Committee) Concern.
O. E. Dial, C. F. Davis, Eugene Kozik, Kenneth L. Kraemer, and William H. Mitchel. 1972, 22p HUD-0000901

When the United Information Systems Inter - Agency Committee (USAC) began operating the Integrated Municipal Information System (IMIS), immediate benefits were visualized: first, the system would enable cities to automate operations, improve service delivery, and generate basic information for good decisionmaking; and second, this system would create a broad data base which is accurate and timely and which can be tapped for information about Federal programs in urban communities. Both benefits require standardization of the data. At present data are being successfully standardized within each USAC city but standardization among cities does not exist. Part of the problem is due to inconsistent definitions used by various Federal programs. The data processing manager in a city with several such programs faces the problem of reconciling data incompatibility not only within the city's system but among Federal agencies in order to automate reporting requirements. Several attempts have been made to standardize data at the Federal level. (An appendix lists these documents.) However, these standardization objectives are not being met. Data standardization should be mandatory and the recommended and optional categories for Federal agencies should be deleted. The standardization subcommittee of USAC or a similar group should develop comprehensive standards, and an implementation strategy should be developed.

PB80-136989 PC **A02**/MF **A01**
Claremont Men's Coll., CA.
Evaluation: A USAC (United Information Systems Inter-Agency Committee) Concern.
Kenneth L. Kraemer, Carl F. Davis, O. E. Dial, Eugene Kozik, and William H. Mitchel. 1972, 21p HUD-0000902

Contracts which the Urban Information Systems Inter - Agency Committee (USAC) issued for building the Integrated Municipal Information System (IMIS) prototypes called for evaluation activities to be conducted as part of local project efforts. Phase 6 called for a periodic technical evaluation, and Phase 9 called for an impact assessment in the municipality. Technical evaluations conducted to date generally review and critique the specific processes used and the resulting products. Some attempts to assess the utility of the software developed have also been made. Phase 9 assessments are more complex and less structured. They review and critique project orientation, training, and administration, and also attempt to determine the impact of the system on daily operations and decisionmaking in the municipality. A matrix summarizes the evaluation approaches used in each of the project cities. In general, the USAC cities are yet to develop a common approach to either technical assessments or impact evaluations. Each of the five cities has developed innovative methods to deal with the evaluation problem, but no one city has a full set of solutions and no two cities employ the same solutions. The cities are attempting to measure the impact on city services, on attitudes and behavior, on management and planning, and on costs, with secondary benefits listed. These initial experiences should be aggregated to develop evaluation criteria.

PB80-136997 PC **A04**/MF **A01**
Claremont Graduate School, CA.
File Organization Design Criteria: A USAC (United Information Systems Inter-Agency Committee) Concern.
Eugene Kozik, C. F. Davis, O. E. Dial, Kenneth L. Kraemer, and William H. Mitchel. 1972, 55p HUD-0000903

File organization, as defined by the Integrated Municipal Information System (IMIS) projects, is the formatting of data and records with threaded list

processing controls, data element linking, the assignment of these data and records to selected file structures, and storage of these files and accession. Although IMIS is a relatively complex system, data users with little data processing training are profoundly influencing system development by indirectly influencing file organization. This is usually done by imposing monetary constraints, defining jobs to be done, determining response time, establishing security requirements, and establishing priorities. If IMIS is to be effective, more attention should be given to file design parameters. There are two prime methods of processing IMIS data: Index Sequential Access Method (ISAM) and Direct Access Method. Because most project cities' computer systems currently support an ISAM file handler, this method is popular. However, ISAM has greater search time and its use may make retrieval from large volumes of data cumbersome. In general, the Direct Access Method is preferred. Several cities are developing hybrid techniques and an Integrated Direct Access Method should be ready soon. File management involves tradeoffs between complete or extensive cross - linkage of data, which is extremely expensive, and economical organization which is cumbersome. These tradeoffs will be resolved by reaching a point of equilibrium. Charts and tables illustrate the discussion.

PB80-137003 PC **A02**/MF **A01**
Claremont Graduate School, CA.
Geocoding: A USAC (United Information System Inter-Agency Committee) Concern.
O. E. Dial, C. F. Davis, Eugene Kozik, Kenneth L. Kraemer, and William H. Mitchel. 1972, 19p HUD-0000904

Files with geocoded data may be searched by using geographic indices. Files are commonly searched or linked by name, event, time, or general area (i.e., precinct, school district). Until geocoding, however, it was not possible to search by specific location, such as 'number of traffic accidents at the corner of A Street and Third Avenue.' Geocoding may be so complex that it can locate a point with greater precision, or it may provide information only be predefined zones. Probably the most widely known geographic - based file is the DIME (Dual Independent Map Encoding) System developed by the U.S. Census Bureau. The geocoding provision is the Request for Proposal which the Urban Information Systems Inter - Agency Committee issued in conjunction with the Integrated Municipal Information Systems (IMIS) project is based on DIME. These specifications state that IMIS geocoding systems must, at minimum, organize a city by grids, aggregate records to which these codes have been assigned into geographic groups, and display the data either in map or other graphic form. This geocoding project has run into problems because the Census Bureau has been unable to deliver its portion of the work on schedule. Long Beach, Calif., has gone ahead and developed its own geocoding software. The status of geocoding in Charlotte, N.C., Wichita Falls, Tex., Reading, Pa., and Dayton, Ohio, is reviewed.

PB80-137011 PC **A03**/MF **A01**
Claremont Graduate School, CA.
Overview of USAC (United Information Systems Inter-Agency Committee) Programs.
Kenneth L. Kraemer, C. F. Davis, O. E. Dial, Eugene Kozik, and William H. Mitchel. 1972, 31p HUD-0000905

The Urban Information Systems Inter - Agency Committee (USAC) is a consortium of 10 Federal departments and agencies. Its primary objectives are to research and develop prototype municipal information systems which can be transferred to other localities. Its major funding effort is the Integrated Municipal Information System (IMIS) program. Contracts for software development were given to six municipal consortia: the Wichita Falls, Tex., 'Total' system; the Charlotte, N.C., 'Total' system; the Long Beach, Calif., public safety system; the St. Paul, Minn., human resources development subsystem; the Reading, Pa., physical and economic development subsystem; and the Dayton, Ohio, public finance and administration subsystem. A 2 - year review found that work was progressing in each city but that the time and money needed to develop IMIS was greatly underestimated. Current estimates are that development will take 5 years and 5 million Federal dollars for system cities and 3 years and 3 million dollars for subsystem cities. (This excludes the human resources development subsystem which has proven more complex than expected and has been abandoned by St. Paul.) Five smaller application projects are now being considered for USAC funding: the Lane County, Ore., data management system; Des Moines, Iowa, geocoding combined with aerial photography; Los Angeles, Calif., housing resource allocation model; Long Beach, Calif., geocoding system, and the New York map reading and digitization system. Organization charts, budgets, and policy statements are appended.

PB80-137029 PC **A02**/MF **A01**
Claremont Graduate School, CA.
Vertical Interjurisdictional Data Flows: A USAC Concern.
Myron E. Weiner, Carl F. Davis, O. E. Dial, Eugene Kozik, and Kenneth L. Kraemer. 1972, 22p HUD-0000906

Vertical interjurisdictional data flows may be lineal (e.g., sequential reporting of health statistics from city to county to State to Federal agency) or radial (simultaneous reporting of statistics by a city to county, State, and Federal agencies); single - level (e.g., city to county) or multilevel (city to county to State); may report events (lists of stolen cars) or provide data for statistics. The organizational, hardware, and software factors which affect such data flows are briefly reviewed. Computerization has been seen as a boon by Federal agencies. They hope that the automation of data will make it easier for them to obtain information for Federal files. Federal program and grant managers also hope automated data processing will make available information to assess the impact of Federal programs. Municipalities hope computerization will ease the paperwork burden associated with mandatory State and Federal reports. The five Integrated Municipal Information Systems (IMIS) projects are addressing the problem of vertical interjurisdictional data flow. Their experience to date indicates that automation will give more accurate and comparable data and more effective delivery of services to municipalities. It may not, however, either reduce the paperwork requirements imposed by State and Federal governments or automate all data that are required for Federal programs.

PB80-137151 MF **A01**
Geological Survey, Reston, VA.
Seismic Safety and Land - Use Planning. Selected Examples from California. Basis for Reduction of Earthquake Hazards, San Francisco Bay Region, California.
M.L. Blair, and W.E. Spangle. 1979, 82p HUD-0001036
Paper copy available from the Sup. of Docs., Stock number 024-001-03231-7.

Although focusing on the 9 - county, 74,400 - square mile San Francisco Bay region in California, this study explores a problem common to all communities: how best to plan for orderly development and growth and yet conserve the natural resource base, ensure public health and safety, and minimize degradation of the natural and man - made environment. The Seismic Safety and Land - Use Planning report presents several examples from California in order to discuss the earth - science data needed for effective planning and the methods that can be used by local and regional government to reduce earthquake risk. Through various State agencies, California provides data on seismic hazards, establishes structural standards, regulates construction and operation of certain critical facilities, maintains an emergency preparedness plan, and requires cities and counties to prepare seismic safety plans. However, effective local planning is essential to reduce seismic risk. Assessing risk starts with recognizing the overall seismicity of the area and identifying potential for groundshaking, landsliding, liquefaction, surface rupture, and flooding. A "design earthquake" should be used as a basis for prediction. Cultural features should be inventoried and mapped, with attention to facilities such as large dams, whose failures could be disastrous, and high - occupancy structures. Using this information, officials can express risk in terms of potential dollar loss, deaths, injuries, etc., and begin formulating plans and regulations to reduce risk through local land - use planning and regulation. Methods include considering seismic hazards in analyzing land capability, developing policies consistent with seismic risk, and establishing project review procedures to ensure consideration of seismic risk. Maps, graphs, photographs, and illustrations of earthquake damage at several California sites are presented as tools for officials to use in assessing their seismic risk. References are appended. (Author abstract modified).

PB80-137326 PC **A02**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Surface Preparation of Pavements Prior to Application of Pavement Markings.
Final rept.,
John M. Dale. Jan 80, 23p FHWA-TS-80-207
Contract DOT-FH-11-9298

This project was undertaken to demonstrate that surface preparation of pavements by wire brushing prior to application of traffic marking paint would result in extended service life of traffic marking paint. A brush assembly was designed, fabricated and installed on a Texas Department of Highways and Public Transportation striping truck and run over a variety of roads. It was found that brushing did not significantly extend the service life of the traffic marking paint. There was not sufficient improvement to consider mounting brush assemblies ahead of the spray guns on striping trucks for use on a daily basis.

PB80-137375 PC **A04**/MF **A01**
Maryland Univ., Solomons. Chesapeake Biological Lab.
Calvert Cliffs Nuclear Facility Monitoring Program: Ichthyoplankton Program, Troika Studies, 1977.
Final rept.,
K. V. Wood, L. Lubbers, and J. A. Mihursky. Jan 79, 72p UMCEES-79-66-CBL, PPSP-CC-79-3

The Calvert Cliffs Nuclear Power Plant is located in mid-Chesapeake Bay in mesohaline estuarine waters. A once-through cooling system is used, with a shoreline intake, and discharge 800' offshore at the 20' depth contour. Numerous studies have demonstrated mortality effects upon entrained organisms passing through such open, once-through heat exchange systems. Temperature, pressure, biocides and mechanical action have been cited as causative factors. In August 1971, an investigation of the ichthyoplankton community in the vicinity of Calvert Cliffs Power Plant was initiated. Information regarding spatial and temporal ichthyoplankton distributions and long-term trends is given in the report.

PB80-137458 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Simulating the Appearance of Rural Roads.
B. J. Slee. c1979, 19p TRRL-SUPPLEMENTARY-426

This Report describes a method for making films to simulate the appearance of new transport systems in rural landscapes. The simulation films are made using the travelling matte process, which is a motion picture special effects technique. Film of an existing road of the correct standard, carrying traffic, is combined with film of the background landscape, so producing a simulation film. Two methods are briefly described, one using cine film, the other video. (Copyright (c) Crown Copyright 1979.)

PB80-137466 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Variability of Indirect-Tensile and Compressive Strengths of Concrete in Road Pavement Contracts.
R. E. Franklin, W. E. Gibbs, and Marilyn H. Burtwell. c1979, 19p TRRL-SUPPLEMENTARY-477

In 1971 the Department of the Environment issued Technical Memorandum H10/71 which introduced the use of the indirect-tensile test on cylinders, in place of the traditional compressive test on cubes, for the specification of concrete strength in road pavements. With the object of assessing the effects of the new specification on the variability and level of strength results, cubes and cylinders, addi-

tional to those normally required for compliance with the specification, were made and tested on ten major road contracts. The overall standard deviation of the indirect-tensile and compressive strength results at 28 days was 0.33 and 4.6 N/square millimeters, respectively. The mean strengths at 28 days on the various sites ranged from 29.7 to 46.0 N/square millimeters in compression and from 2.56 to 3.46 N/square millimeters in indirect tension with overall mean strengths of 39.8 and 3.04 N/square millimeters, respectively. Testing variability at 28 days was higher for the indirect-tensile test than for the compression test in terms of coefficient of variation. The values obtained were 6.1 percent and 3.9 percent respectively. Although testing variability of the cylinders was better than that found in earlier site studies, further improvement is desirable to permit a more sensitive control of concrete quality. (Copyright (c) Crown Copyright 1979.)

PB80-137532 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
M6 Reconstruction 1976: Two-Way Traffic Using Narrow Lanes,
A. D. Maclean. c1979, 23p TRRL-SUPPLEMENTARY-474

A system of two-way traffic using lanes of substandard width to provide two traffic lanes in each direction on a single three-lane carriageway was implemented during the reconstruction of a section of M6 motorway in 1976. Despite the reduced lane widths (2.75 meters for light vehicles, 3.35 meters for heavy vehicles), the capacity and journey-time/flow relations for the site did not differ appreciably from those for standard lanes. Even when the hard shoulder (which was in use as a traffic lane) failed locally under the weight of the heavy vehicles and the relative positions of the light and heavy vehicles were reversed to reduce the loading on the hard shoulder, the extra maneuvers involved did not appear to affect the performance of the site. Overall, the delays averaged only 270 veh-h per day, and these would have been considerably higher if any other method of operation (segregated contra-flow or two-way operation with standard-width lanes) had been used. The accident rate at the site averaged 35 injury accidents per 10 to the 8th power veh-km--rather less than that experienced in general at other major works, whether or not narrow lanes were used. The increase was confined entirely to the daytime accidents. (Copyright (c) Crown Copyright 1979.)

PB80-137540 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Interim Report on the Performance of Surfacings for Maintaining Bituminous Roads: A1 Buckden (1975-1977),
J. R. Brown. c1979, 27p TRRL-SUPPLEMENTARY-476

A range of wearing-course materials suitable for the maintenance of bituminous roads is being compared in a full-scale experiment laid on Trunk Road A1 at Buckden in Cambridgeshire during 1975 and 1976. They include open-textured macadam, pervious macadam, dense bitumen macadam, Delugrip materials, rolled asphalt and a surface dressing. Their performance is being assessed from measurements of deformation, deflection, riding quality, texture depth, sideway-force coefficient, braking-force coefficient, permeability, void content, noise and spray and this Report gives interim results obtained during the first two years of trafficking. All the wearing-course materials gave good resistance to deformation, good riding quality and, because aggregates of high polished-stone value were used, good resistance to skidding at low speed (50 km/h). The surface dressing, pervious macadam and well-chipped rolled asphalt provided adequate texture depth and showed little reduction in braking-force coefficient for an increase in speed from 50 to 130 km/h whereas the Delugrip materials, dense bitumen macadam and open-textured macadam, unable to maintain a substantial texture depth, showed a 20-40 per cent reduction. Some of these low-textured materials proved to be permeable to water. It was also found that they contributed less to the recorded traffic noise and, except for the open-textured macadam, generated more spray than those with deeper texture. (Copyright (c) Crown Copyright 1979.)

PB80-137557 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Predictive Accuracy of British Transport Studies - A Feasibility Study,
I. H. Mackinder. c1979, 30p TRRL-SUPPLEMENTARY-483

Transport studies have been undertaken in this country for over fifteen years. During that time much criticism has been levelled against them, and yet to date there has been no serious attempt to evaluate their predictive accuracy. This report describes a feasibility study to investigate whether it would be practicable to examine the predictive accuracy of early British studies by comparing forecasts made in them with current information.

PB80-137607 PC **A04**/MF **A01**
California Dept. of Health Services, Berkeley. Air and Industrial Hygiene Lab. Section.
Technique for in situ Calibration of Particulate Mass Monitors.
Final rept.,
Walter John, Susanne Hering, and Jerome J. Wesolowski. Oct 79, 56p EPA-600/2-79-191
Grant EPA-R-805577010

Two types of aerosol generators, the Riker Laboratories metered spray can and the Mistogen EN145 ultrasonic nebulizer, were evaluated by laboratory measurements for application to the in situ calibration of particulate mass monitors for stationary sources. The metered spray can delivers a fixed amount of aerosol each time the valve is depressed. The average mass of propellant and solution in each squirt is 52 mg, and is reproducible within 4%. The volume median diameter was varied from 1.4 to 3.2 micrometers by selection of solute concentration. Because of its simplicity and reproducibility of output, the metered spray may be useful for a variety of applications requiring a portable aerosol source. For calibrating stack beta gauges, larger aerosol output of 5-10 mg is needed, requiring a valve with a metering volume at least ten times larger than present valves. Contact electrification monitors require a test aerosol of 25 mg/cu m at a flow of 1 cu m/min. Appropriate for this application is the ultrasonic nebulizer, which has an output of 50 mg/min, constant to within 8% over a period of hours.

PB80-137987 PC **A03**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Toll Financing.
Working paper,
Leonard Merewitz. Nov 78, 32p NTPSC/WP-79/08

The study of toll road financing examines tool roads both as an alternative in highway finance and as a means of achieving social ends, such as the reduction of traffic congestion and improvement of air quality in urban areas.

PB80-137995 PC **A02**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
The Intercity Bus Industry: A Bibliography.
Working paper,
Janice W. Bain. May 79, 16p NTPSC/WP-79/10

A partially annotated bibliography of books, articles, and reports on the intercity bus industry is presented. The bibliography is not intended to be comprehensive, but should be considered a guide to current bibliographic resources on the subject.

PB80-138019 PC **A03**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Findings and Recommendations of the Commission on Federal Paperwork.
Working paper,
Helen E. Ramatowski. Mar 78, 43p NTPSC/WP-79/04

The National Transportation Policy Study Commission report reviews the work of the Commission on Federal Paperwork to determine the relevance of the latter Commission's recommendations to transport policy formulation.

PB80-138027 PC **A13**/MF **A01**
Notre Dame Univ., IN.
Structural Evaluation of New Concepts for Long-Span Culverts and Culvert Installations.
Interim rept. May 76-Jul 79,
M. G. Katona, D. F. Meinhert, R. Orillac, and C. H. Lee. Dec 79, 297p FHWA-RD-79-115
Contract DOT-FH-11-9408
See also report dated Aug 77, PB-278 696.

Analytical structural evaluations of long-span and conventional culvert installations are made using a finite element soil-structure model. Included in the evaluation are the relative merits of conventional soil-structure design parameters of soil quality and compaction, footing width (for arches), metal liner thickness, metal liner shape, scale of structure, and special manufacturing features, such as thrust beam, rib stiffeners, and soil bin. Results indicate that soil stiffness is the most significant parameter related to deformations in the structure. Maximum thrust force is generally insensitive to all conventional design parameters. Further analytical evaluations are made of new concepts, including reinforced earth, stabilized soil zones, selective placement of soft inclusions, and controlled joint slippage. Results suggest that soil reinforcement used in conjunction with long-span culverts may be a cost-effective technique to limit structural deformations and enhance structural capacity. It also appears that controlled joint slippage may be the most cost-effective method to reduce thrust. Other parameters investigated included selective placement of stabilized soil, V-notch void, and fluid jackets for concrete pipe, all of which appeared to improve the structural performance of culverts.

PB80-138035 PC **A04**/MF **A01**
IIT Research Inst., Chicago, IL.
Aerosol Source Characterization Study in Miami, Florida. Microscopical Analysis.
Final rept. Jun 75-Aug 77,
Ronald G. Draftz. Sep 79, 70p EPA-600/3-79-097
Grant EPA-R-803078

In June 1975 the U.S. Environmental Protection Agency conducted an experimental program in the Miami metropolitan area to collect atmospheric aerosols for the purpose of identifying aerosol composition and determing aerosol sources. Samples were collected for mass, trace metals, and microscopical analyses. Microscopical analyses showed that the composition of Miami's TSP (total suspended particulate) was similar to that of Chicago, St. Louis, and Philadelphia, with the exception that Miami receives a significant impact from ocean spray. Mineral fragments resuspended by traffic appear to be the primary aerosol mass contributor. Rubber tire fragments and carbonaceous vehicle exhaust are also major TSP contributors. These conclusions are based solely on three sampling days at three sites and should be confirmed by additional studies. However, the aerosol types and amounts found in Miami are likely to remain fairly constant throughout the year.

PB80-138142 PC **A03**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Longitudinal Control and Reliability Project. A Review of AGT (Automated Guideway Transit) Communication System Technology. Part B.
Final rept.,
P. Schumacher. Jul 79, 28p OTIS-TTD-VLCR-065, UMTA-IT-06-0148-79-3
Contract DOT-UT-70048
See also Part A, PB80-114036.

This report assesses the current state-of-the-art. The review concentrates on the communication links used within the longitudinal control loop. It discusses the criteria for establishing data rate, and the major aspects of a communication system starting with the transmission media modulation techniques, followed by noise and error considerations. The review is concluded with a brief summary of data communication in existing AGT systems.

PB80-138167 PC A03/MF A01
Colorado State Dept. of Highways, Denver. Div. of Transportation Planning.
Low Flush Toilets at Deer Trail Rest Area.
Final rept.,
Werner Hutter. Oct 79, 33p CDOH-DTP-R-79-10, FHWA-CO-79-10

This report describes the evaluation of Microphor LF-210 water conserving toilets. The performance of the units were observed and recorded during the 1979 tourist season. According to the data collected, the system's performance was very good, with some minor problems initially. The resulting waste water volumes compare excellently with those associated with conventional rest areas since only 25% water consumption was experienced at the rest area. Water consumption was 1.26 gallons (4.77 litres) per restroom user.

PB80-138225 PC A03/MF A01
National Transportation Policy Study Commission, Washington, DC.
Motor Carrier Entry Control Modification: Railroad Trucking Restrictions and Common Ownership.
Working paper,
Merrill J. Roberts. Sep 79, 35p NTPSC/WP-79/12

The paper evaluates a proposal whereby all trucking associated with Trailer-on-Flat-Car (TOFC) service would be deregulated. Specifically current restrictions on railroad affiliated trucking operations would be relaxed to permit railroads to provide TOFC trucking services beyond the confines of their stations. Similarly, truck operators not controlled or affiliated with railroads would be given full freedom to compete for TOFC traffic. Ramp-to-ramp TOFC facilities would be open to all potential users on an equal basis. The proposal is advanced as a means of minimizing adverse effects on market structure while maximizing the potential for the physical integration of rail-truck services, and is seen as providing an intermediate test of the economic potential and possible market effects of common ownership of intermodal services.

PB80-138241 PC A99/MF A01
Rockwell International, Creve Coeur, MO. Environmental Monitoring and Services Center.
Documentation of the Regional Air Pollution Study (RAPS) and Related Investigations in the St. Louis Air Quality Control Region.
Final rept.,
Joseph A. Strothmann, and Francis A. Schiermeier. Dec 79, 717p EPA-600/4-79-076
Contract EPA-68-02-2093

During the period of 1974 to 1977, the Regional Air pollution Study (RAPS) was conducted in the St. Louis, Missouri/Illinois Metropolitan Area. Because of the availability of extensive monitoring data, additional independent research studies were conducted in the St. Louis area during this time frame. This report is an attempt to document nearly all the RAPS and related investigations conducted in the St. Louis Air Quality Control Region during the period of 1973 to 1978. Descriptions of locally-operated air quality and meteorological networks are also included. Such a report will serve as a summary of data available to the EPA modelers in pursuit of the RAPS objectives and will be used by RAPS researchers to locate supplementary data sources to augment their own measurements.

PB80-138274 PC A05/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Improved Drainage and Frost Action Criteria for New Jersey Pavement Design. Phase III: Structural Strength of Pavement with Open-Graded Bases.
Final rept.,
Walter R. Barker, and Robert C. Gunkel. Aug 79, 87p 79-002-7740, FHWA-RD-79-S0928
Sponsored in part by New Jersey Dept. of Transportation, Trenton.

Gyratory shear tests and repeated load triaxial compression tests were conducted on five different base courses which were furnished by the New Jersey Department of Transportation (NJDOT). Two of the materials, one stabilized with asphalt and the other unstabilized, were open-graded aggregate bases designed to provide a high degree of porosity. The other three materials were conventional bases now being used by the NJDOT. The conventional bases were a high-quality, asphalt-stabilized base material, a crushed rock, and a pit-run gravel. The laboratory tests indicated that for dynamic loads, such as would be the case for high-speed highway traffic, the open-graded bases would perform better than or as well as the nonstabilized conventional bases but not as well as the high-quality stabilized base. For static loading the nonstabilized bases were superior to the asphalt-stabilized bases. The minimum coverage requirement for the open-graded bases is estimated to be approximately 6 in. The data provided by gyratory testing proved to be useful in evaluating the base materials, and the recommendation is made to continue development of gyratory testing for evaluation of pavement materials.

PB80-138282 PC A06/MF A01
West Virginia Univ., Morgantown. Dept. of Industrial Engineering.
Feasibility of a Complimentary Solution to the Bus Operator Scheduling Problem.
Final rept. Jul-Dec 78,
Richard E. Ward, and Philip A. Durant. Dec 79, 107p 795620R001REW, UMTA-WV-11-0001-80-1

The report is concerned primarily with computerized run-cutting. Run-cutting in the bus industry deals with the problem of assigning operators or drivers to work the vehicle schedules. The objective of run-cutting is to create cost effective bus driver assignments, known as runs or duties, to work or cover a predefined schedule of bus service. This report deals specifically with run-cutting in the bus industry, and it builds on and synthesizes experiences already gained in this field. Driver duties vary in type. One characteristic which defines a duty-type is the time of day it begins and completes it assigned work. Basic methodology is outlined in the report, and the results from experiments are collated and reported when the methodology was applied to three real-life data sets acquired from three different bus properties. The goal of this study is to provide added insight into the methods of using computer based algorithms to solve the original problem, which is the creation and selection of duties to cover the full day schedule of bus service.

PB80-138399 PC A03/MF A01
Illinois State Dept. of Transportation, Springfield. Bureau of Materials and Physical Research.
Results of Bridge Deck Condition Surveys and Corrosion Rate Determination.
Interim rept. Jun 76-Dec 78,
John E. LaCroix. Jun 79, 27p PHYSICAL RESEARCH-86, FHWA-IL-PR-80-086

Twenty bridge decks are being observed to determine the behavior and probable service lives of concrete bridge decks with waterproofing systems where the free chloride-ion content was two or more lbs per cu yd at the top mat of reinforcement when the waterproofing was constructed. Fifteen of the decks had 40 percent or more of the top mat reinforcement actively corroding according to copper-copper sulphate half-cell measurements. The other five decks had 5 percent to 40 percent of the top mat of reinforcement actively corroding. Initial postconstruction survey results show that the waterproofing system used gives good initial protection from moisture penetration from the surface, and that 83 percent of the study decks contain delaminations. Nearly all delaminations found after construction were small in size and tended to be located within the same area as delaminations found during preconstruction surveys. Corrosion rates tended to decrease after the waterproofing system had been completed.

PB80-138415 PC A03/MF A01
National Transportation Policy Study Commission, Washington, DC.
European Modal Split Policies.
Working paper,
Alan E. Pisarski. Jun 79, 29p NTPSC/WP-79-23

The paper summarizes the objectives of those European countries that have established modal split policies; the nature of the policies employed; and the varying degrees of success obtained in diverting both freight and passenger traffic toward preferred modal distributions.

PB80-138423 PC A03/MF A01
National Transportation Policy Study Commission, Washington, DC.
Urban Rail Conflicts.
Working paper,
Peter C. Weingarten. Jul 79, 39p NTPSC/WP-79-30

The paper discusses conflicts that can arise among railroads, motor vehicle traffic, and other activities in urban areas. Possible urban rail conflicts include safety hazards at grade crossings, traffic delays and congestion, isolation of neighborhoods, environmental damage. Alternative solutions for these problems are discussed, including grade crossing improvements, train scheduling improvements, consolidation of rail lines, railroad relocation. Availability of Federal and other funding is discussed.

PB80-138753 PC A05/MF A01
New Jersey Dept. of Transportation, Trenton. Bureau of Operations Research.
Center Barrier Visibility Study.
Final rept. Sep 72-Jan 78,
William L. Mullowney. Jan 78, 84p 80-002-7710, FHWA/NJ-80/002

A prototype delineation system was developed for installation on concrete median barriers. The visibility of the reflective devices was evaluated with respect to the following factors: the effect of weathering on the reflectivity of the reflectors, the effect of weathering and other destructive forces on the durability of the reflectors, and the effects of vertical placement, opposing headlight glare and wet night conditions on the visibility of an installation. Mounting materials and techniques were evaluated to determine the most durable with respect to weathering and other destructive forces. Eight millimeter color motion pictures were taken of an experimental installation under dry night and wet night conditions. An estimated cost for installing median barrier delineators was calculated separately for curves and tangents.

PB80-139058 PC A04/MF A01
Meteorology Research, Inc., Altadena, CA.
Pollutant Measurements in Plumes from Power Plants and Cities - St. Louis Area, July 1976. A Project MISTT (Midwest Sulfur Transformation and Transport) Report.
Final rept. Jun 76-Dec 77,
John A. Ogren, Jerry A. Anderson, and Donald L. Blumenthal. Nov 79, 59p MRI-78-FR-1586, EPA-600/7-79-242
Contract EPA-68-02-2411

Airborne measurements of aerosols and pollutant gases in urban and power plant plumes were conducted during July 1976 in the vicinity of St. Louis, Missouri. The measurements, performed as part of Project MISTT, were designed to characterize the physical and chemical behavior of these plumes under a variety of meteorological conditions. The airborne data were analyzed to gain a better understanding of the factors affecting the transport, transformation, and removal of primary and secondary pollutants, particularly those containing sulfur. The field program and experimental techniques are described, and the results and conclusions of the analyses of the airborne measurements and meteorological data are presented.

PB80-139074 PC A04/MF A01
IIT Research Inst., Chicago, IL.
Houston Urban Plume Study, 1974. Microscopical Identification of Collected Aerosols.
Interim rept. Jul 74-Oct 77,
Ronald G. Draftz, and Jean Graf. Sep 79, 62p EPA-600/3-79-090
Grant EPA-R-803078

An urban plume study was conducted in Houston during July 1974 to gain preliminary data on the concentration and composition of primary and secondary aerosols contributing to Houston's air pollution problem. Selected membrane filter samples containing urban aerosols were analyzed by polarized light and scanning electron microscopy to identify the aerosols and their possible sources. The aerosol samples, collected by aircraft at elevations from 1,000 to 4,000 feet above sea level, consisted principally (more than 95 percent by number) of mineral silicate fragments. A trace to

minor quantity of carbonaceous particles (resembling diesel exhaust), lead bromide compounds (from vehicle exhausts), and sea salt were also found in most samples. No discrete particles of ammonium sulfate were present.

PB80-139322 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Inst. of Hydraulic Research.
Scour Around Circular Bridge Piers at High Froude Numbers.
Final rept. Jun 77-Apr 79,
Subhash C. Jain, and Edward E. Fischer. Apr 79, 71p IIHR-220, FHWA-RD-79-104
Contract DOT-FH-11-9276

The results of laboratory experiments on scour around circular piers in cohesionless bed material at high Froude numbers, F, up to 1.5 are presented. The scour depths in sediment transport regime (F>Fc) first slightly decreases and then increases with the increase in the Froude number. A formula to predict the scour depth at Froude numbers (F-Fc) = or > 0.15, is developed. The limitations of some of the existing predictors of local scour are discussed, and a new formula to predict the maximum clear-water scour is proposed.

PB80-139348 PC **A03**/MF **A01**
Argonne National Lab., IL. Energy and Environmental Systems Div.
Revised Prioritized List of Source Categories for NSPS (New Source Performance Standards) Promulgation.
Final rept.,
M. R. Monarch. Mar 79, 30p EPA-450/3-79-023

The Clean Air Act Amendments of 1977 require that the USEPA consider specific criteria in determining priorities for setting NSPS for major source categories: quantity of air pollutant emissions, extent to which air pollutant emissions endanger public health and welfare and the mobility and competitive nature of each source category. A previous report (EPA-450/3-78-019) describes a methodology that has been developed for prioritizing source categories using the Clean Air Act criteria. The methodology, which employs three distinct computer programs, was applied to a data set of over 150 major source categories for nine different air pollutant emissions (particulate matter, sulfur dioxide, nitrogen oxides, hydrocarbons, carbon monoxide, lead, sulfuric acid mist, hydrogen sulfide, and fluorides). The program output is a prioritized list of source categories for NSPS promulgation over a ten year period based on a multipollutant source category emission analysis, and was used to propose standard-setting priorities. This report incorporates input data revisions resulting from comments on the proposed list and is used to determine a revised NSPS priority list.

PB80-139520 PC **A07**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Civil Engineering.
Identification of Traffic Management Problems in Work Zones.
Final rept. 30 Sep 77-1 Feb 79,
J. B. Humphreys, H. D. Mauldin, and T. D. Sullivan. Dec 79, 147p FHWA-RD-79-4
Contract DOT-FH-11-9368

The report presents a prioritized listing of twenty problem statements relating to traffic safety in construction, maintenance and utility work zones. These problem statements were developed from (1) data collected during 103 site visits, (2) an analysis of 30 construction zones before and during accident case studies, (3) a literature review, and (4) personal experiences of an interdisciplinary, six-person professional staff. Results indicate that approximately two-thirds of the work zone safety problems could be ameliorated if current standards and/or knowledge were properly applied. Results also include data relative to traffic control device use, traffic operation, and accident location in work zones.

PB80-139579 PC **A08**/MF **A01**
Maine Univ. at Orono.
An Assessment of the On-Site Waste Water Management Program in the State of Maine.
Master's thesis,
Joel D. Davis. May 79, 165p W80-03083, OWRT-A-046-ME(1)

On-site waste water management program applications of the Maine Plumbing Code were studied to clarify the relationship between plumbing regulations and land use activity and to determine the perspective of the local plumbing inspector. State and local approaches to on-site waste water management programs administration and regulation were also studied. Maine continues to have an on-site rather than a centralized approach to waste water treatment.

PB80-139595 PC **A05**/MF **A01**
Maine Univ. at Orono. Dept. of Civil Engineering.
An Approach for Hydrodynamic Modeling of Maine's Estuaries.
Master's thesis,
Robert Bruce Fidler. Aug 79, 84p W80-03084, OWRT-A-047-ME(2)

A hydrodynamic study of the Upper Penobscot Bay in Maine was conducted using a three dimensional finite difference model. Penobscot Bay is a major commercial, industrial, and fishing center for the state. Models for water and waste movement are needed due to the rapid industrial growth along Maine's coast and the subsequent water pollution problems. The model used here, GAL (for Galerkin) was implemented on the University of Maine IBM 370 System and to supplement printed output, pictoral representations of calculations current velocities are provided. Five sets of data are needed for the model: (1) bathymetry, (2) tidal, (3) river flow, (4) wind, and (5) current characteristics data. The Navier-Stokes equations and the continuity equations are used to describe processes causing water motion. A comparison of model results and actual field data show some successful significant information.

PB80-139603 PC **A05**/MF **A01**
Arizona Water Resources Research Center, Tucson.
Legal Rights to Sewage Effluent.
Project completion rept. 1 Oct 78-30 Sep 79,
Deborah Sliz, and Sara Powell. 15 Oct 79, 79p W80-03009, OWRT-A-090-ARIZ(1)
Contract DI-14-34-0001-8003

The legal aspects of waste water recapture or reuse are examined for the Tucson, Arizona, areas, however, the legal problems examined are not limited exclusively to this area. The sole source of water supply for Tucson is pumped groundwater from the alluvial basin of an intermittent stream, the Santa Cruz. Due to the limited water resources of the area problems over the legal rights of the city and county to control sewage effluent from the city have developed. In the past treated effluent was discharged into the Santa Cruz stream bed for recharge of the aquifer. The city now plans to recapture and reuse or exchange the effluent. The city of Tucson has filed a complaint to prevent the county control of effluent originating in the municipal system. There are also other actual and potential conflicts over disposition and use of effluent. Case law and selected statutes which currently govern recapture are analyzed and the right of the city to use and to reuse water pumped from the Santa Cruz basin is examined.

PB80-139629 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Virginia Water Resources Research Center.
Measuring the Risks of Waste Disposal by Deep-Well Injection.
Charles H. Breeden. Jan 80, 46p VPI-VWRRC-BULL-122, W80-03005, OWRT-A-066-VA(2)
Prepared in cooperation with Marquette Univ., Milwaukee, WI.

Much research has been conducted previously on the direct physical costs and the economic effects of changes in operating criteria and design parameters for deep-well waste disposal systems. However, many important considerations, such as the evaluation of risk in the design and operation of a disposal well, have received less attention. This study addresses these injection well failure data, which are important to both industrial and public policy decisionmakers who need to assess the genuine economic feasibility of this disposal method. In addition to identifying the direct costs of deep-well waste disposal, the study (1) illustrates ways in which a decisionmaker might quantify the risks associated with waste injection in an attempt to make these contingent cost explicit, and (2) presents computations for the indirect costs of uncertain risks by using an expected value technique and applying it to several hypothetical circumstances.

PB80-139660 PC **A08**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Technical Guidelines for Expansive Soils in Highway Subgrades.
Final rept.,
Donald R. Snethen. Jun 79, 172p FHWA/RD-79-51

Volume change of expansive soil subgrades resulting from moisture variations causes an estimated annual damage of $1.7 billion to streets and highways. Minimization of the detrimental damage to pavements on expansive soils was the subject of a 4-yr research study conducted by the U.S. Army Engineer Waterways Experiment Station. The results of that study that should be implemented are presented in this report. Technical guidelines are presented on: the location of potentially expansive soil areas using occurrence and distribution maps, as well as alternative sources of information; field exploration and sampling of expansive soils; identification and classification of potentially expansive soils using index and soil suction properties; testing of expansive soils and prediction of anticipated volume change; selection of appropriate treatment alternatives; and presentation of design, construction, and maintenance recommendations for new and existing highways. Appendixes to the technical guidance report describe the soil suction test procedure, a standard procedure for odometer swell tests, procedure for calculating the Potential Vertical Rise (PVR), a bibliography on treatment alternatives, and standards for field monitoring data.

PB80-139777 PC **A04**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Issues in Evaluating Amtrack.
Working paper,
Jimmy Butler. Jan 79, 57p NTPSC/WP-79-27

The paper compares seven recent reports about Amtrak. The reports were all prepared by different agencies for different reasons, but have some points in common. Their interpretations of Amtrak's past performance, route structure, economic efficiency, long-term financial outlook, and ability to meet social and economic goals are compared and contrasted.

PB80-139868 PC **A12**/MF **A01**
SCS Engineers, Long Beach, CA.
Research on Equipment Technology Utilized by Local Government: Refuse Collection.
Technical rept.
30 Mar 79, 258p NSF/RA-790050
Contract NSF-C77-17354

This report summarizes a two-phase effort to develop a systematic approach to allow optimal selection of residential refuse collection equipment for local needs. The scope of this investigation is limited to collection equipment utilized for residential solid waste collection. The effort reported here: (1) identifies the collection equipment objectives; (2) presents an overview of significant characteristics and features of current refuse equipment technology; (3) reviews conditions under which the refuse equipment must operate; (4) establishes guidelines for evaluation of performance standards and specifications; (5) presents a life cycle cost analysis on a conceptual basis; (6) presents a set of performance standards (numerical values for levels of performance that must be met); (7) develops and validates standardized test procedures to measure the equipment performance attributes identified as most important in equipment productivity; and (8) prepares a User's Manual, which is a tool designed to allow collection vehicle users to write performance specifications tailored to their specific local conditions. Also conducted were special studies which evaluated methods of reducing vehicle tare rate and various interim transfer systems.

PB80-139926 PC **A03**/MF **A01**
Department of Transportation, Washington, DC. Research and Special Programs Administration.

An Introduction to Freight Pipeline Transportation,
David C. Ryan, Jr. Jun 78, 40p DOT-RSPA-DPA-80-1

This report provides an introductory overview on the subject of freight transportation by pipeline. Emphasis has been placed on the ease with which non-technical people could read and understand the essentials. This results in a non-analytic presentation of the qualitative rather than quantitative characteristics of freight pipeline. The material presented is based on a number of technical papers and analytical studies which are representative of the present state-of-the-art in freight pipeline technology. This report provides a brief introduction to the subject of freight transportation by pipelines, then describes the major generic classes of freight pipeline (pneumatic, slurry, pneumatic-capsule, and hydraulic-capsule), then briefly discusses future prospects.

PB80-140007 PC **A09**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Management of Air Quality in and Near Highway Tunnels.
Interim rept. Jun 74-Sep 77,
R. N. Schlaug, L. H. Teuscher, and P. Newmark. Jan 80, 200p FHWA-RD-78-184
Contract DOT-FH-11-8538

The literature describing highway tunnel design techniques and ventilation system operation was reviewed to determine the factors that affect air quality in highway tunnels. It is shown how these factors can be incorporated into simple analytic and numerical models to estimate pollutant distributions along the tunnel and in the transverse cross section. This survey was supplemented by visits to fourteen operating highway tunnels. The air quality management practices at each tunnel are described. The health effects literature was also surveyed and information is presented on the long and short term physiological effects of vehicle pollutants. The adequacy of present tunnel air quality standards is discussed.

PB80-140031 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Biochemical Significance of Arsenical Pollutants in a Potable Water Supply.
Final technical completion rept.,
S. D. Faust, and W. H. Clement. Jan 80, 22p W80-03175, OWRT-A-051-NJ(1)
Contract DI-14-34-0001-8032

It was the purpose of this research project to examine the chemical and biological significance of arsenical compounds in a New Jersey fresh surface water (Union Lake and the Maurice River and its tributaries) through laboratory and field investigations. These waters serve as recreational waters for the cities of Millville and Vineland, N.J. and are also a secondary source of drinking water for Millville. These waters and the bottom muds are known to contain arsenical pollutants. The specific objectives of the research were the following: Characterize and identify arsenical compounds in the water, muds, and sediments; investigate the mechanism(s) by which arsenical compounds are sorbed, released, retained, or transported by sediments.

PB80-140056 PC **A02**/MF **A01**
Connecticut Univ., Storrs. Inst. of Water Resources.
Design of a Subsurface Waste Disposal System with Biological Denitrification.
Technical completion rept. Jul 75-Sep 79,
Rein Laak. 17 Oct 79, 22p W80-03174, OWRT-A-062-CONN(1)
Contract DI-14-34-0001-9007

Nitrogen was removed from septic tank effluent in a nitrification-denitrification system, using greywater as the organic carbon source in the denitrification step. A preliminary study showed greywater from a typical home contained abundant soluble carbon that biodegraded at the same rate as methanol, which, until this study, appeared to be the most promising source of organic carbon for such a system. A second laboratory study used aerobic sand column reactors to nitrify unfiltered septic tank effluent, and fixed media columns consisting of stones. Greywater, settled sewage, and methanol were added prior to the denitrification step to determine their suitability as possible sources of organic carbon. A field demonstration model was then built, using an aerobic subsurface sand filter bed for blackwater nitrification and an anoxic denitrification reactor based on a five day liquid detention time. Some of the greywater from the household acted as the carbon source for denitrification, removing up to 99% of the available nitrate.

PB80-140072 PC **A07**/MF **A01**
North Carolina Water Resources Research Inst., Raleigh.
The Impacts of Rural Water Systems in North Carolina: An Exploratory Study.
Bruce J. Mauch Knopf, Janet E. McKinnon, and Raymond J. Burby. Nov 79, 128p UNC-WRRI-79-151, W80-03003, OWRT-A-103-NC(1)
Contract DI-14-34-0001-9035

As a result of increasing rural community demand for urban-type service, concern exists that the installation of rural water systems will induce sprawl development with detrimental impacts. This report presents the results of a study on the formation, expansion and impacts of rural water systems in NC. in an attempt to strengthen decision-making and project review procedures related to rural water systems. The findings indicate that local decisions regarding the formation and expansion of rural water systems have been based on present and anticipated needs and engineering and financial feasibility analyses. Decisions rarely included factors related to capital improvement budgeting and planning or long-term costs to communities of providing sewerage and other services required by the subsequently induced new development.

PB80-140098 PC **A04**/MF **A01**
Arizona Univ., Tucson. Dept. of Civil Engineering.
Sand Filtration of Oxidation Pond Effluent for Reuse in Park Irrigation.
Project completion rept.,
D. R. Kasper, R. A. Phillips, R. A. Sierka, and N. J. Myers. Jan 80, 75p W80-03004, OWRT-A-052-ARIZ(1)

This study is an investigation of intermittent sand filtration of oxidation pond effluent utilizing local river bed sands as filter media. The experimental set-up for this investigation consisted of several laboratory scale filter columns filled with local river bed sands. These columns were dosed at a selected rate and sequence with oxidation pond effluent. The parameters investigated included depth, dosing sequence, and hydraulic loading rate. The results of the quality parameters investigated, including COD, volatile and total suspended solids, turbidity and algae concentration, were evaluated statistically.

PB80-140130 PC **A02**/MF **A01**
Arizona Univ., Tucson. Dept. of Watershed Management.
Hydrologic Considerations in Decision Analyses for Reclaiming Strip Mine Land in the Southwest.
Project completion rept. 1 Oct 76-31 Jan 79,
T. Verma, and J. Thames. Jan 80, 18p W80-03176, OWRT-B-055-ARIZ(3)
Contract DI-14-34-0001-7139

A multiattribute utility function is used to model preferences on outcomes of alternative reclamation schemes for stripmined lands, using Arizona and Wyoming examples. Each scheme should at least help restore land to its premining value, and is composed of three sets of actions: mining operations, preparations for postmining land use, and mitigating actions. Grazing and runoff augmentation are examples of postmining land use goals, and mitigating actions may be measures to protect the environment like pollution control in runoff or infiltration. Conflicting objectives are involved, including the maintenance of sufficient coal production, the alleviation of detrimental environmental effects, and the minimization of loss. A multiobjective decision-making scheme under uncertainty is set up to analyze the problem. The decision model ranks alternative reclamation schemes on the basis of the preference function of a group decision maker.

PB80-140189 PC **A09**/MF **A01**
Maine Univ. at Orono. Dept. of Civil Engineering.
A Study of the Efficiency of Septic Tanks Effluent Treatment in Two Raised Bed Systems.
Master's thesis,
Gary Stephen Nault. Aug 79, 189p W80-03085, OWRT-A-040-ME(2)

Two raised bed systems for distribution of septic tank effluent located in Orono, Maine, on soils not suitable for conventional septic tank soil absorption systems were studied to determine treatment performance under given trench and site conditions. The two 'mound' systems were installed at private homes and chemical, physical, and biological parameters were monitored during 1978 and 1979. Results show that groundwater table location in relation to the sand fill is a dominant factor in treatment efficiency. Sand fill treatment efficiency decreased as saturation conditions increased.

PB80-140254 PC **A07**/MF **A01**
Polytechnic Inst. of New York, Brooklyn. Center for Regional Technology.
Studies of Thermal Electric Power Plant Heated Discharges. Phase III. Development and Testing of Three-Dimensional Plume Models and Investigation of Thermal Fronts.
Final rept. 1977-78,
A. S. Goodman, and J. C. Cataldo. Aug 78, 130p NYSERDA-78-19

This report covers the 1977-78 research program to predict the three-dimensional distribution of water temperature of a thermal plume by using discharge data gathered from an infrared overflight. This is one technique to obtain information necessary to meet state monitoring requirements and can be useful in evaluating the environmental effects of power plants. The thermal front phenomenon observed during field surveys in June 1978 at the Ginna Generating Station on Lake Ontario is described in the report.

PB80-140676 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Architecture and Planning.
Programming for Research in Design and Behavior, Within the Building Sciences.
Final rept.,
Sandra C. Howell, and Anne Vernez-Moudon. Apr 79, 109p NSF/RA-790290

A case study is presented of a process of cross-discipline development of an applied research strategy in building sciences with the MIT School of Architecture and Urban Studies. Although it broadly addresses concerns of fields considered to be within the domain of the building sciences, its focus is on the potential of two specific areas, architecture and behavioral science, as they might link in a long-term academic research enterprise. The study is divided into four sections: planning and preparation, which includes identification of problems in interdisciplinary research in building sciences, arraying of primary issues, and a statement of interdisciplinary issue; development of an information base involving society, physical environment and change, and theories and methods of building morphology; formulation of inter-disciplinary strategy which includes a staging of collaborative research and a proposal for a collaborative project. The appendices consist of a report for the National Endowment for the Arts on neighborhood revitalization, an investigation of regulatory barriers to the re-use of existing buildings, a preliminary and critical review of residential energy consumption and family life styles, and a working paper on research in behavior in the built environment.

PB80-140791 PC **A06**/MF **A01**
Evans-Hamilton, Inc., Seattle, WA. Western Region.
Dynamics of Port Angeles Harbor and Approaches, Washington.
Research rept.,
Curtis C. Ebbesmeyer, Jeffrey M. Cox, Jonathan M. Helseth, Laurence R. Hinchey, and David W. Thomson. Sep 79, 121p EPA-600/7-79-252
Prepared in cooperation with National Oceanic and Atmospheric Administration, Seattle, WA. Environmental Research Labs.

Historical oceanographic data in Port Angeles Harbor, located behind a spit on the northern coast

of Washington, have been analyzed with emphasis on the physical processes that transport and disperse spilled oil. The data base spans 1932-1979 and includes observations of tides, currents, winds, runoff, water properties, oil spills, suspended sediment, and pulp mill effluent. A hydraulic tidal model was used to provide additional continuity in space and time of tidal flows within the Harbor and several miles of the shore. The plan view of mean circulation near the surface in the approaches consists of westward flow at midchannel and an eastward countercurrent within several miles of the U.S. shore. Experiments in the hydraulic tidal model and a 19-day current record suggest a tidally induced weak mean circulation eastward in the Harbor near the surface.

PB80-140817 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Analysis of the Responses from an Associated General Contractors of America (AGC) Survey of Trenching and Shoring Practices,
Lawrence A. Salomone, and Felix Y. Yokel. Jul 79, 62p NBSIR-79-1936
Prepared in cooperation with Occupational Safety and Health Administration, Washington, DC.

Results of an Associated General Contractors of America (AGC) survey of present practice in excavation, trenching, and shoring, and of the impact of the OSHA Regulations for Excavation, Trenching, and Shoring as perceived by a selected number of the membership are presented. The survey consisted of forty-seven (47) questions. A response of about fifty percent resulted in twenty-three (23) questionnaires being completed and returned to AGC. Although the twenty-three responses did not merit a rigorous statistical analysis, the data are useful in making some general statements about trenching and excavation operations.

PB80-140841 PC **A08**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Hydraulic Geometry and Carrying Capacity of Floodplains.
Final rept. 1 Oct 76-30 Mar 79,
Nani G. Bhowmik, and John B. Stall. Sep 79, 155p UILU-WRC-79-0145, W80-03172, OWRT-B-100-Ill(3)
Contract DI-14-34-0001-7153
Prepared in cooperation with Illinois State Water Survey, Urbana.

Hydraulic geometry relationships for floodplains of nine river basins in Illinois and four river basins outside of the state were developed. Relationships between floodplain width, cross-sectional area, surface area, depth, sinuosity, incision, and stream order have been developed. These hydraulic geometry parameters were also found to be related to the drainage area of the individual stream segments. Hydraulic geometry coefficients of the floodplains of Illinois streams were found to be similar although the developed relationships have different base values. Hypsometric analyses of the Illinois streams indicated that most of the streams in Illinois are in a mature stage of development. All of the hydraulic geometry parameters of the floodplains increased in the downstream direction. Actual field data related to the carrying capacity of floodplains were analyzed to determine the distribution of flow in the main channel and in the floodplains.

PB80-140858 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Evaluation of Mound Systems for Renovation of Septic Tank Effluent.
Research project technical completion rept.,
Gary W. Petersen, and Daniel D. Fritton. Dec 79, 105p RESEARCH PUB-102, W80-03001, OWRT-B-098-PA(3)
Contract DI-14-34-0001-7129

Elevated sand mounds were introduced in 1974 and are currently widely used in Pennsylvania for on-site domestic waste disposal. This report describes the project undertaken to assess the effectiveness of the systems and to determine the varied conditions under which the systems succeed or fail. Data from questionnaire and field studies indicated that a considerable number of elevated mound systems are malfunctioning throughout Pennsylvania. The rate of malfunction varied regionally and was related to placement of systems on unsuitable sites, construction problems, and to unsuitable soil and site characteristics not defined in the regulations. In some areas, the designed lateral-plus-vertical flow capabilities were insufficient to dissipate the effluent resulting in malfunctions on sites found suitable under current regulations. Laboratory studies indicated that with sufficient effluent dissipation, adequate renovation should occur within and beneath the mound systems. Siting, design, construction and maintenance recommendations were made for Pennsylvania elevated sand mounds.

PB80-140882 PC **A06**/MF **A01**
Colorado State Univ., Fort Collins.
Regulatory Water Quality Monitoring Networks. Statistical and Economic Considerations.
Final rept.,
Jim C. Loftis, and Robert C. Ward. Aug 79, 105p
EPA-600/4-79-055
Grant EPA-R-805759010

The purpose of this study is to examine and quantify the statistical trade-offs associated with using various levels of statistical sophistication in network design and to formulate a procedure for accounting for economic constraints in design process. Sampling frequency is the major aspect of network design considered in the study; consequently, the results of the study are directed toward their use by regulatory agencies for the evaluation and upgrading of existing networks.

PB80-140999 PC **A15**/MF **A01**
Geomet, Inc., Gaithersburg, MD.
Power Plant Stack Plumes in Complex Terrain. Data Analysis and Characterization of Plume Behavior.
Final rept. 1 Jun 78-17 Aug 79,
Kenneth E. Pickering, Robert H. Woodward, and Robert C. Koch. Jan 80, 334p EPA-600/7-80-008
Contract EPA-68-02-2260

Aerometric data were collected during 16 months in the vicinity of the coal-fired Clinch River Power Plant, located in the complex terrain of southwestern Virginia. Statistical analyses of SO2, NO, and NO sub x concentrations at eight fixed monitoring sites revealed significant diurnal and seasonal variations. Cross-section pollutant and meteorological measurements made from a helicopter were analyzed to show the dimensions of the plume. Plume heights calculated from wind and temperature profiles and plume widths calculated from the standard deviation of wind direction produced improvements over standard estimates. The influence of terrain features on the shape and path of the plume is clearly shown when assessing the helicopter data and selected case studies of ground monitoring data. Parameters for a Gaussian plume model were modified in a stepwise manner by using site specific meteorological data. The data obtained for the Clinch River site should be useful in further diagnosis and model testing of plume behavior in complex terrain.

PB80-141120 PC **A17**/MF **A01**
South Tahoe Public Utilities District, South Lake Tahoe, CA.
Proposed Wastewater Treatment Facilities, South Shore Lake Tahoe Basin. Technical Appendices. Draft Environmental Impact Statement.
Oct 79, 380p
Sponsored in part by Environmental Protection Agency, San Francisco, CA. Region IX. Prepared in cooperation with Douglas County Sewer Improvement District No. 1, NV. See also PB80-141138.

The draft environmental impact statement investigates the secondary impacts of expanding and improving the two wastewater treatment facilities that serve the south shore of the Lake Tahoe Basin. The statement describes five alternative growth scenarios which are used to assess the impacts on both the natural and manmade (social) environments. These technical appendices provide background and supporting information for the material contained in the draft environmental impact statement.

PB80-141138 PC **A15**/MF **A01**
South Tahoe Public Utilities District, South Lake Tahoe, CA.
Proposed Wastewater Treatment Facilities, South Shore Lake Tahoe Basin. Draft Environmental Impact Statement.
Oct 79, 331p
Sponsored in part by Environmental Protection Agency, San Francisco, CA. Region IX. Prepared in cooperation with Douglas County Sewer Improvement District No. 1, NV. See also PB80-141120.

The draft environmental impact statement investigates the secondary impacts of expanding and improving the two wastewater treatment facilities that serve the south shore of the Lake Tahoe Basin. The statement describes five alternative growth scenarios which are used to assess the impacts on both the natural and manmade (social) environments.

PB80-141195 PC **A06**/MF **A01**
Lehigh Univ., Bethlehem, PA. Fritz Engineering Lab.
Prediction of Prestress Losses in Post-Tensioned Members.
Interim rept.,
Ti Huang, and Burt Hoffman. Dec 79, 105p
LEHIGH/FL-402-3, FHWA-PA-RD-74-3.3
Sponsored in part by Pennsylvania Dept. of Transportation, Harrisburg.

A previous procedure for the estimation of long-term prestress losses in pretensioned concrete bridge members is expanded to apply to post-tensioned members. The procedure is based on the same basic characteristic stress-strain-time relationships for the concrete and steel materials. The time and strain compatibility conditions are modified to reflect the particular conditions in a post-tensioned member. Further modifications are made to allow for multi-stage post-tensioning, as well as application of loads at several stages. Examples are presented demonstrating the use of these proposed procedures. Results are compared with those obtained from the method contained in the present AASHTO Specifications.

PB80-141245 PC **A04**/MF **A01**
Minnesota Dept. of Transportation, St. Paul. Research and Standards Section.
Performance Evaluation of Bridge Deck Protection Systems. Volume III.
Interim rept. Jan-Dec 78,
M. G. Hagen, and R. G. Tracy. Dec 78, 64p
FHWA/MN/RD-79/03
See also Volume 2, PB-297 737.

This report represents data obtained through a comprehensive field study encompassing some 70 bridge decks with a variety of protection systems in-place and subject to varying traffic volumes and conditions of exposure. Decks repaired also exhibited varying initial condition and extents of concrete removal prior to rehabilitation.

PB80-141260 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Civil Engineering.
Seismic Analysis and Design of Buried Pipelines (Seismic Vulnerability, Behavior and Design of Underground Piping Systems).
Technical rept. no. 10,
Leon Ru-Liang Wang. Aug 79, 17p NSF/RA-790272
Grant NSF-PFR78-15856

Analysis procedures and design criteria for buried pipeline systems to resist earthquakes are described. Increasing attention is being devoted to the earthquake damage of buried pipelines because of the impact of disturbed conveyor systems on the citizenry during and after major earthquakes. These involve loss of fire fighting capability, disruption of energy transportation, and disease hazard resulting from damage to water, oil or gas, and sewer/pipelines respectively. To evaluate the adequacy of existing systems and improve the design of future systems, 'Simplified Analysis' and 'Quasi-static Analysis' approaches are presented for use in computing pipe strains and relative joint displacements due to seismic ground shaking. Related parameters to fulfill analysis requirements are described. Both active and passive design pro-

cedures and considerations to reduce seismic damage of buried pipelines are presented. The most important factor in designing buried pipelines is ductility or flexibility which permits buried pipelines movement with ground displacement.

PB80-141377 PC **A04**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Practical Application of Sensitivities of Stream Water Quality Parameters.
Technical rept. Sep 78-Jan 80,
Ching-Gung Wen, Jao-Fuan Kao, Lawrence K. Wang, and Mu Hao Wang. 5 Jan 80, 61p SIT/ME/01-80/1
Prepared in cooperation with National Cheng Kung Univ., Tainan (Taiwan). Dept. of Environmental Engineering., and National Science Foundation, Taipei (Taiwan).

The sensitivity equations of stream water quality parameters are presented, and their practical applications to stream pollution control scientifically illustrated. Non-tidal streams are classified into: (a) clean or slightly polluted swift streams; (b) moderately polluted swift streams; (c) heavily polluted swift streams; (d) clean or slightly polluted, intermediate streams; (e) moderately polluted intermediate streams; (f) heavily polluted intermediate streams, (g) clean or slightly polluted slow streams; (h) moderately polluted slow streams; and (i) heavily polluted slow streams. Tidal streams are classified into: (a) clean or slightly polluted tidal streams, (b) moderately polluted tidal streams; and (c) heavily polluted tidal streams. The characteristics and water quality parameter ranges of the twelve types of receiving streams are presented. The significance of water quality sensitivities and dissolved oxygen deficits are systematically identified.

PB80-141385 PC **A03**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Mathematical Modeling of Stream Water Quality by a New Moment Method: Field Investigation of a Tidal River.
Technical rept. Sep 78-Oct 79.
Oct 79, 30p SIT-ME/10-79-2
Prepared in cooperation with National Cheng Kung Univ., Tainan (Taiwan). Dept. of Environmental Engineering., and National Science Foundation, Taipei (Taiwan).

A field study is presented to demonstrate a number of special features of a new moment method. The new moment method can be used for modeling of water quality parameters of both non-tidal streams and tidal streams. A detailed example illustrates how the following five water quality parameters can be systematically identified: (1) the reaeration coefficient; (2) the coefficient of organics settling and other parameters; (3) the rate of organics addition to the overlying water from the bottom deposits as well as local run-off; (4) the oxygen production rate by photosynthesis; and (5) the longitudinal dispersion coefficient. The new system identification method can be used when the stream velocity, the downstream distance, the stream water temperature, the biochemical oxygen demand (BOD) of stream water at each sampling station, the dissolved oxygen (DO) of stream water at each sampling station, and the BOD reaction rate are known. The observed BOD and DO values are in excellent agreement with the BOD and DO values estimated by the authors' mathematical models.

PB80-141393 PC **A02**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Critical Review and Proposed Modifications of Hunter's Model for Water Distribution System Design.
Technical rept. Dec 78-Oct 79,
Wen-Yung W. Chan, and Lawrence K. Wang. 1 Oct 79, 22p SIT-ME/10-79-1

In this study, the urgent need for research to investigate the frequency of use and the duration of use parameters for sizing water distribution systems is identified, the acquisition of some field data at Stevens Institute of Technology is introduced, and the improved values for the frequency of use parameters in sizing water supply systems are established. The results indicate that an improved mathematical model for estimating the demand for water within buildings may be adequately developed. With this knowledge, the relation of the frequency of use to design number of fixtures for a simple system has been simulated by a computer program. Suggestions on further development of Hunter's curves are also presented.

PB80-141401 PC **A13**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Computer-Aided Planning and Design of Water Distribution System for the Town of Bennington, Vermont.
Final project rept. Nov 76-Mar 79,
Lawrence K. Wang, Donald B. Aulenbach, and Raymond J. Yesselman. Mar 79, 282p SIT-ME/3-79-1
Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. Dept. of Chemical and Environmental Engineering, and Permutit Co., Inc., Paramus, NJ. Sponsored in part by Town of Bennington, VT.

The Town of Bennington's water distribution system has been a major concern for the past several years. Two areas of difficulty describe the situation: (1) Extensions of the system were installed and recorded by a variety of contractors. As a result, the entire system (including valving and interconnection of major pipe-lines) has never been integrated into one overall working drawing. (2) Due to the vast difference in elevation of various sections of the Town, both excessive and inadequate pressures have been experienced throughout the distribution system. As part of this project: (1) One integrated drawing of the entire water distribution system has been completed and tracings have been retained by the Town of Bennington. (2) A working computer program has been developed quantifying existing pipe flows and water pressure and projecting water pressures with future system modifications and consumptions.

PB80-141575 PC **A06**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Users Guide for the TUNVEN and DUCT Programs.
Final rept. Jun 74-Apr 79,
R. N. Schlaug. Jan 80, 113p FHWA-RD-78-187
Contract DOT-FH-11-8538

This manual contains a description, input instructions, sample problems, and listings for two computer programs relating to the design and operation of highway tunnel ventilation systems. The TUNVEN program solves the coupled one dimensional steady state tunnel aerodynamics and advection equations to obtain the longitudinal air velocities and pollutant concentrations for a given tunnel design, traffic load and ventilation rate. The DUCT program calculates the air flow through the individual ports connecting the ventilation duct to the roadway in a semi-transverse ventilation system. It can be used to design a port system that will give approximately uniform flow through each port or to determine the flow pattern through a set of existing ports under off-design conditions.

PB80-141617 PC **A07**/MF **A01**
Policy Planning and Evaluation, Inc., McLean, VA.
Economic and Administrative Feasibility Analysis of Alternative New-Car NOx Emission Charge Strategies.
Final rept.,
James Roberts, and Jasbinder Singh. 15 Dec 79, 136p EPA-230/3-79-005
Contract EPA-68-01-5124

The report examines the economic and administrative feasibility of using a charge, based on the level of emissions of oxides of nitrogen (NOx) from new automobiles, as a method of controlling the NOx emissions from new automobiles. The charge is considered only for NOx emission levels of 1.0 grams/mile (1.0 NOx) and below. It is assumed that the statutory emissions standards (0.41 gram/mile for hydrocarbons (HC), 3.4 grams/mile for carbon monoxide (CO), and 1.0 grams/mile for NOx) mandated to come into effect in 1981 by the Clean Air Act will be in effect during any time for which the NOx charge is contemplated. Thus the sale of automobiles with emissions greater than 1.0 NOx will be prohibited by the standard. Special attention in the report is paid to reducing NOx emissions to the research goal of 0.4 NOx contained in the Clean Air Act.

PB80-141807 PC **A16**/MF **A01**
Rutherford (G. S.) and Associates, Washington, DC.
Transit Network Analysis: INET.
Final rept.,
R. B. Dial, G. S. Rutherford, and L. Quillian. Jul 79, 360p UMTA-UPM-20-79-3
Contract DOT-OST-78-048

This report is a collection of five independently developed documents concerning the transit system analysis program INET (Integrated Transit Network). The five documents are titled: INET Tutorial, a technical introduction to INET functions and mechanics; INET Lecture Guide, a set of over 50 graphics suitable for overhead projection, along with an explanatory text for each; INET Coding Hints, some guidance on preparation of INET input from actual transit plans or operations; INET Case Study, a small, complete example of the use of INET with the Alexandria, Virginia, bus system; and INET Operating Instructions, the instructions for operation of the INET computer program. INET, a new computer program which is an integral part of UTPS (Urban Transportation Planning System), has been developed to aid planners in the analysis of urban transit systems. INET makes transit network coding quick and easy by exploiting data already available for highway networks. It maintains consistency between transit and highway levels of service, and it helps bridge the gap between transit planning and operations. Experience with actual highway and transit data has shown that INET performs with speed and accuracy even better than expected. INET is a substantial improvement over previous transit network programs and greatly facilitates transit systems analysis.

PB80-141849 PC **A02**/MF **A01**
Federal Highway Administration, Washington, DC. Office of Research.
Evaluation of Techniques for Warning of Slow-Moving Vehicles Ahead: Executive Summary.
Final rept.,
H. S. Lum. Jul 79, 11p FHWA-RD-79-97
See also report dated May 79, PB80-114572.

The report summarizes the findings of an experiment conducted at the Federal Highway Administration's Maine Facility to examine the relative effectiveness of roadside signs and vehicle markings for warning motorists of the presence of a slow-moving vehicle on the road ahead in a rural two-lane situation. The principal finding was that the use of standard four-way flashers is an effective device for reducing the hazardousness of the overtaking situation relative to reaction distance, speed reduction, and vehicle following characteristics. The effects of the roadside signs were positive in the vicinity of the sign placement (out of sight of the slow-moving vehicle), but there was no lasting effects relative to the actual overtaking maneuver.

PB80-141872 PC **A06**/MF **A01**
Ohio State Univ., Columbus. Dept. of Civil Engineering.
Latex Modified Concrete Bridge Deck Overlays-Field Performance Analysis.
Final rept.,
Alfred G. Bishara. Oct 79, 111p FHWA/OH-79/004
Sponsored in part by Ohio Dept. of Transportation, Columbus.

Data on field performance of 132 bridge decks overlaid by latex mortar or concrete in Ohio, Michigan, Kentucky and West Virginia, as well as some data from Minnesota and Vermont were collected according to a specially designed inspection questionnaire. Common durability distress features and the factors that might influence them were identified. Statistical analysis was performed to determine the set of variables that best explain the variation in the surface distress features among the different latex projects investigated and to quantify the relationship between overlay condition and the pertinent variables through the formulation of regression models. Further assessment of available performance data was conducted to tie the obtained relationships with the limited data on effectiveness of latex overlays in providing corrosion

protection to the deck rebars and to develop hypotheses on the formation and development of latex overlays' various durability deficiency features. The results obtained and the conclusions drawn explain, quantify and delineate the interrelationship among such factors as years of service, ADT, trafficked vs. untrafficked decks during placement, continuous vs. simply supported decks, thickness of overlay and skid number, on the overlay durability and corrosion protection capability.

PB80-141880 PC **A12**/MF **A01**
Texas Univ. at Austin. Council for Advanced Transportation Studies.
Cost-Effectiveness Measures for Transportation Services for the Elderly and the Handicapped. Volume I.
Final rept.,
Sandra Rosenbloom, Alessandro Pio, John F. Hickman, Alan Black, and Carole Schlessinger. 31 Oct 79, 269p UMTA-TX-11-0009-80-1

The purpose of the study was to identify the costs of different types of transportation service provision to the elderly and handicapped and to develop methods by which transportation planners and social service agencies could evaluate and estimate the costs and effectiveness of such alternatives. The study was designed with two distinct audiences in mind: (1) to provide information on the cost and effectiveness of alternative models of service delivery for use by national and state policy planners; and (2) to present local planners with easy-to-understand methods to estimate the costs they would incur in providing transportation to their clients and to evaluate both the cost and service features offered by the alternative providers or arrangements in their communities. This is the first of the two volumes that comprise the Final Report of the entire study. This volume was designed with the first audience in mind; it is a comprehensive, comparative evaluation of the costs of alternative service arrangements.

PB80-142011 PC **A03**/MF **A01**
Austin Research Engineers, Inc., TX.
Pavement Management System Development.
Final rept.,
W. R. Hudson, R. Haas, and R. Daryl Pedigo. Nov 79, 43p TRB/NCHRP/REP-215, ISBN-0-309-03010-2
Report on National Cooperative Highway Research Program. Library of Congress catalog card no. 79-67653.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418,

This report describes the concept of a pavement management system (PMS) and provides an analysis of PMS development and implementation. It reviews progress that has been made toward development of the PMS concept and concludes that no highway agencies have a complete PMS operational. However, many agencies are using the concept on an evolutionary basis.

PB80-142078 PC **A04**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Bayesian Methodology for Verifying Recommendations to Minimize Asphalt Pavement Distress.
Final rept.,
W. Smith, F. Finn, R. Kulkarni, C. Saraf, and K. Nair. Jun 79, 62p TRB/NCHRP/REP-213, ISBN-0-309-03006-4
Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials. Report on National Cooperative Highway Research Program. Library of Congress catalog card no. 79-67357. Also pub. as ISSN-0077-5614.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

This report documents the development of a Bayesian methodology to quantify multiple regression models from personal interviews with experienced individuals. Procedures for combining this information with objective (measured) data were also demonstrated. Pilot implementation of the methodology was conducted in six states--Arizona, Colorado, Utah, Florida, Louisiana, and Virginia--to investigate the influence of designer-controlled variables on the occurrence of fatigue cracking. Four designer-controlled variables were considered: asphalt penetration, asphalt content, proportion of asphalt concrete, and base density. A multiple regression prediction model of fatigue cracking was defined in each state. In all six states it was found that the fatigue life cycle increased with increase of the asphalt penetration, asphalt content, proportion of asphalt concrete, and base density. The models allow prediction of the fatigue life cycle for any specified level of reliability and designer-controlled variable values. The results obtained were used as a basis to verify design recommendations made in a previous study, NCHRP 9-4, to minimize premature cracking. Only the recommendation to use harder grades of asphalts (lower penetrations) for thick asphalt concrete layers could not be verified. Further study is needed to resolve this difference.

PB80-142086 PC **A03**/MF **A01**
Massachusetts Univ., Amherst.
Ecological Effects of Highway Fills on Wetlands; Research Report.
Final rept.,
P. W. Shuldiner, D. F. Cope, and R. B. Newton. Dec 79, 44p TRB/NCHRP/REP-218A, ISBN-0-309-03014-5
See also PB80-142094. Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials, Washington, DC. Report on National Cooperative Highway Research Program. Library of Congress catalog card no. 79-92988. Also pub. as ISSN-0077-5614.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

This report constitutes the results of a thorough review of the literature pertaining to wetland ecology and the environmental impacts of highways and analogous structures. In all but one of a series of case studies conducted throughout the United States as part of the research, highway-induced alterations in surface and/or subsurface drainage resulted in significant changes in the ecology of the affected wetlands. A companion document, NCHRP Report 218B, contains a User's Manual providing in a concise format guidelines and information needed for the determination of the ecological effects that may result from the placement of highway fills on wetlands and associated flood plains and to suggest procedures by which deleterious impacts can be minimized or avoided. The practices that can be used to enhance the positive benefits are also discussed. Both reports cover the most common physical, chemical, and biological effects that the highway engineer is likely to encounter when placing fills in wetlands and displays the effects and their interactions in a series of flow charts and matrices.

PB80-142094 PC **A06**/MF **A01**
Massachusetts Univ., Amherst.
Ecological Effects of Highway Fills on Wetlands; User's Manual.
Final rept.,
P. W. Shuldiner, D. F. Cope, and R. B. Newton. Dec 79, 109p TRB/NCHRP/REP-218B, ISBN-0-309-03015-3
Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials, Washington, DC. Report on National Cooperative Highway Research Program. Library of Congress catalog card no. 79-57399. Also pub. as ISSN-0077-5614. See also PB80-142086.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

This report is a User's Manual that was prepared to provide in a concise format guidelines and information needed for the determination of the ecological effects that may result from the placement of highway fills on wetlands and associated floodplains and to suggest procedures by which deleterious impacts can be minimized or avoided. The practices that can be used to enhance the positive benefits are also discussed. Both reports cover the most common physical, chemical, and biological effects that the highway engineer is likely to encounter when placing fills in wetlands and displays the effects and their interactions in a series of flow charts and matrices.

PB80-143803 PC **A24**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Aerodynamics and Air Quality Management of Highway Tunnels.
Final rept. 1975-78,
R. N. Schlaug, and T. J. Carlin. Apr 79, 552p FHWA-RD-78-185
Contract DOT-FH-11-8538

All factors affecting aerodynamic flow and air quality in highway tunnels are identified and a model developed for calculating quasi-steady-state longitudinal air velocities and pollutant concentrations. The TUNVEN computer program obtains numerical solutions for the model and allows the ventilation rate needed for safe tunnel operation to be quickly determined. The model is used to calculate tunnel air quality with different ventilation systems, traffic conditions, tunnel length and other parameters. Guidelines are given for choosing an appropriate ventilation system and for developing air quality management plans. Air flow along ventilation ducts is analyzed and a finite step model developed. The DUCT computer program gives numerical solutions for inflow semi-transverse ventilation systems. Examples are given for determining port areas for uniform flow and port flows when the areas are specified. A heat balance for highway tunnels is presented and used to investigate temperature and humidity effects. Conditions necessary for fog formation are determined and the incidence and control of fires discussed. The use of air purification systems in highway tunnel is investigated. Technically feasible processes are identified and costs compared with augmented ventilation.

PB80-144587 PC **A04**/MF **A01**
Coastal Environments, Inc., Baton Rouge, LA.
Operation of the Old River Control Project, Atchafalaya Basin: An Evaluation from Multiuse Management Standpoint.
Final rept.,
Johannes L. van Beek, Ava L. Harmon, Charles L. Wax, and Karen M. Wicker. Nov 79, 74p EPA-600/4-79-093
Contract EPA-68-03-2665

This report evaluated from a multiuse management standpoint the operation of the Old River Control Project. It was found that limiting diversions to the extent presently being considered by the Old River Control Project would effectively remove those wetlands that are presently flooded for a period of 0 to 4 months from the aquatic ecosystem as a type habitat representing as much as 36 percent of the wetlands of the overflow areas in the Atchafalaya Basin. Without stronger land-use controls, a reduction in the annual extent of flooding could encourage new residential and agricultural development in the present wetlands.

PB80-144637 PC **A18**/MF **A01**
Environmental Protection Agency, Washington, DC. Oil and Special Materials Control Div.
Hazardous Materials Incidents Reported to U.S. Environmental Protection Agency Regional Offices from October, 1977 through September, 1979.
Jan 80, 412p EPA-430/9-79/019

The purpose of this two-year record of 3,076 hazardous material incidents is to help demonstrate the magnitude of the hazardous material spill problem in the United States today. To this end, it is mainly a compilation of those incidents reported to the ten Regional Offices of the United States Environmental Protection Agency (EPA). The report is divided into two sections covering the fiscal years 1979 and 1978, respectively. The incident data includes location, date, type of incident, material involved and its volume, the environmental medium affected, and additional information as comments where available.

PB80-145683 PC **A04**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Air Quality Impact of Proposed HDV Emission Standards - Summary of Results.
Technical rept.,

Lois Platte. Dec 79, 69p EPA-AA-TAEB-80-7

This report presents the results of the estimated air quality impact of the proposed 1984 heavy-duty vehicle (HDV) emission standards for hydrocarbons and CO. The proposed standards are based on a 90% reduction from the average emissions of the 1969 baseline fleet. In addition to the proposed standards, a no control case and two alternative control strategies were investigated. The assessment of the CO air quality impact of these scenarios was made using the modified rollback model. Both the rollback model and EKMA were used for projecting ozone. This report focuses on the mobile source data assumptions that were used as input to the air quality assessment.

PB80-146111 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Sea Grant Coll. Program.
California's Coastal Wetlands,
Sana Siwolop, and Henri Albert. 1979, 42p
CSGCP-69, NOAA-79122806
Grant NOAA-04-8-M01-189

Contents:
- The coastal wetlands:
- A balance of perspective;
- Stresses on the wetlands:
- A question of limits;
- Wetland management:
- A 'many-handed' responsibility;
- Interpretive programs for the public.

PB80-146194 PC **A13**/MF **A01**
Texas Transportation Inst., College Station.
Pavement and Geometric Design Criteria for Minimizing Hydroplaning.
Final rept. (Phase 2),
B. M. Gallaway, D. L. Ivey, G. Hayes, W. B. Ledbetter, and R. M. Olson. Dec 79, 300p
FHWA-RD-79-31
Contract DOT-FH-11-8269
Prepared in cooperation with Texas A and M Univ., College Station.

A comprehensive literature review, multistate questionnaire, mathematical modeling, computer simulation, field testings and data correlations were used to establish criteria relating to geometric and pavement surface characteristics to minimize highway hydroplaning. More specifically, the authors have covered in detail the empirical indications of hydroplaning as determined from interpretation of hard data developed with a spindown trailer in a hydroplaning trough, skid number trailers including drag link and torque, and extensive tire and pavement testing under simulated and natural rain. Precise measurements of surface drainage were examined and equations relating pavement texture, cross slope and rainfall were developed. Random and patterned textures covering the complete range of real-world pavements were included. A determination of deficiencies in existing surface drainage design methodology for sag-vertical curves was conducted by state surveys and representative sites were studied and innovative answers supplied. A summary of criteria to reduce hydroplaning is presented along with recommendations for construction of flexible and rigid pavements to minimize hydroplaning. Extensive field studies of open-graded surfaces, including tire-to-surface contact, reduction of splash and spray, and flatter friction vs. speed gradients.

PB80-146962 PC **A02**
Corps of Engineers, Washington, DC.
Rebuilding the Beaches of Florida,
James W. R. Adams. Apr 79, 5p NOAA-79122702
Pub. in Shore and Beach, v47 n2 p3-5, Apr 79.

The Corps of Engineers has taken an active role in environmental protection on beach erosion control projects and is constantly going through an environmentally sensitive evaluation process in all stages of planning and design. During the past 10 years, the Corps of Engineers has placed 20 million cubic yards of sand on Florida's beaches. By next summer, the total will be 30 million and, to date, no significant long-term environmental damages have been identified.

PB80-147663 PC **A10**/MF **A01**
Environmental Protection Agency, Denver, CO. Surveillance and Analysis Div.
Water and Air Quality Trends in Region VIII (1978 Data).
Final rept.,
Thomas A. Entzminger, Richard Sotiros, and William H. Tabor. Oct 79, 215p EPA-908-79-001
See also report dated Mar 78, PB-283 280.

Water and air quality trends and status for the calendar year 1978 were determined for the six states in Region VIII. These states are Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Data resident in EPA national data banks (STORET, SAROAD) were analyzed. Statistical tests which detect significant differences between two populations were utilized to show trends in both air and water quality. The status and severity of stream pollutants were determined by relating parameter concentrations to Water Quality Indicator (WQI) values on a numerical scale from 0 to 100. The status and severity of air pollutants reported continues to be a direct measure of air quality standard and alert level exceedences.

PB80-147846 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Issues in Transportation Planning for Small and Medium-Sized Communities,
Mark Turnquist, Yehuda Gur, Antoine G. Hobeika, Chaushie Chu, and Marvin Golenberg. 1979, 38p TRB/TRR-730, ISBN-0-309-02984-8
Library of Congress catalog card no. 80-10611.
Also pub. as ISSN-0361-1981.

Contents:
- Estimation of trip tables from observed link volumes;
- Equilibration of supply and demand in designing bus routes for small urban areas;
- Demand-estimating model for transit route and system planning in small urban areas;
- Simulation of travel patterns for small urban areas;
- Framework for transferring travel-characteristics of small urban areas;
- Land-use-allocation model for small and medium-sized cities.

PB80-805773 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: New Automotive Engines and Engine Improvements. Volume 2. 1978-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Feb 80,
Guy E. Habercom, Jr. Mar 80, 154p
Supersedes NTIS/PS-79/0246, NTIS/PS-78/0208, and NTIS/PS-77/0227. See also Volume 1, 1970-1977, NTIS/PS-79/0245.

This bibliography cites reports on new designs of automobile engines. The engine types include gas turbines, stratified charged engines, steam engines, hybrid engines using electric motors or flywheels, and rotary engines. Many of these studies also cover the problem of improving fuel economy while lowering emissions. Retrofit devices are excluded. (This updated bibliography contains 147 abstracts, 47 of which are new entries to the previous edition.)

PB80-805781 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Highway Beautification (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Edith Kenton. Mar 80, 107p
Supersedes NTIS/PS-79/0170, NTIS/PS-78/0019, and NTIS/PS-77/0015.

Reports are cited on beautification and landscaping programs for highways and roads. Esthetic and social concerns are noted. Discussions include plant survival, scenic factors, legislation, planting programs, seeding, and turf maintenance. Reference is made to highway rest areas, noise reduction, and soil mechanics. (This updated bibliography contains 100 abstracts, 2 of which are new entries to the previous edition.)

PB80-805799 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Railroad Freight Transportation. Volume 2. 1975-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-Feb 80,
Edith Kenton. Mar 80, 307p
Supersedes NTIS/PS-79/0189, NTIS/PS-78/0182, and NTIS/PS-77/0197. See also Volume 1, 1964-1974, NTIS/PS-77/0196.

The references cited deal with economic impacts, intermodal systems, energy studies, scheduling, rolling stock utilization, rail revitalization, accident studies, cost analyses, and characteristics within specific regions. The bibliography also covers freight car design, engineering, and testing programs as well as train engineering and operations. (This updated bibliography contains 300 abstracts, 61 of which are new entries to the previous edition.)

SWRA-79-NO-25-P-1-2 PC**$50.00**
Office of Water Research and Technology, Washington, DC. Water Resources Scientific Information Center.
Selected Water Resources Abstracts. Annual Cumulated Indexes to Volume 12, 1979. Part 1. Author, Organization, Accession Number. Part 2. Subject.
1978, 1390p
Also available on subscription, North American Continent price $100.00/year, includes Abstract Journal and Index; all others write for quote.

The document contains indexes to cited reports covering biological, social, and engineering aspects of water resources, and management of the resources.

13C. Construction Equipment Materials, and Supplies

PB80-128317 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Interlaboratory Evaluation of the ASTM (American Society for Testing and Materials) E 84-77a Tunnel Test Modified By the Consumer Product Safety Commission for Cellulosic Loose Fill Insulation.
Final rept.,
J. Randall Lawson. Nov 79, 37p NBSIR-79-1922

An interlaboratory evaluation was conducted to determine precision estimates for repeatability and reproducibility of the American Society for Testing and Materials (ASTM) E 84-77a tunnel test as modified by the Consumer Product Safety Commission for cellulosic loose fill insulation. Six laboratories participated in this study by running tunnel tests on eight cellulosic loose fill materials. Each laboratory was surveyed during the project to examine its conformance with the critical details of the test apparatus and procedure. The results of the survey showed that none of the tunnels completely conformed with the specifications of the modified ASTM E 84-77a standard.

PB80-137474 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Variability in Grading Results Caused by Standard Sample-Reduction Techniques,
D. C. Pike. c1979, 20p TRRL-SUPPLEMENTARY-489

In Great Britain, and elsewhere, the test that is carried out most frequently on aggregates is sieve analysis. Grading tests are quick and cheap, and provide information that can be useful to both producers and users of aggregates. Although they are frequently ignored, sampling and testing errors can contribute markedly to the variability of grading results. In this study eight sub-base materials (maximum size 37.5mm) and two concrete aggregates (a 20 to 5mm gravel and a sand) were subjected to the standard sample-reduction procedures, except that all sub-fractions were tested. It was found that a range of about 6 per cent in grading at the 5mm size could be induced by riffling the sub-bases to the appropriate size for testing. A similar result was found at the 10mm size for the 20 to 5mm gravel, and a range of 4 per cent was found at the 600 micrometer size for the concreting sand. These and other variables attributable to sampling, need

to be taken into account when specifications are being drafted. (Copyright (c) Crown Copyright 1979.)

PB80-137482 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Tunnel Boring Machine Performance and Ground Properties: Report on the Initial 1 1/2 km of the North Wear Drive, Kielder Aqueduct,
J. M. Morgan, D. A. Barratt, and J. A. Hudson.
c1979, 53p TRRL-SUPPLEMENTARY-469

The report describes a study of the construction of the North Wear tunnel from 124 to 1600 m chainage using a tunnel boring machine and the geology encountered. Performance of the tunneling system was assessed from shift inspectors' reports and recorders on the tunnel boring machine. Overall non-driving time accounted for 78 percent of normal working hours, although this reduced to 71 percent when the zone with anomalous behavior was excluded. Examination of how working time was used in the tunnel showed a fairly constant cutting performance whatever the rock type but with large variations in overall progress and also the extent to which progress had been hampered by the difficulties of coping with fractured ground. Principal among these was the blocking of the spoil chute, primary underslung chain conveyor and the late supporting of the roof. The work suggests that improvement can best be made by reducing the time when the tunnel boring machine is idle. (Copyright (c) Crown Copyright 1979.)

PB80-138159 PC **A03**/MF **A01**
Federal Highway Administration, Vancouver, WA. Office of Federal Highway Projects.
Present Aggregate Gradation Control Practices and Alternative Test Methods.
Final rept. Apr 77-Apr 79,
E. S. Richardson, R. E. Rosenbaum, and R. J. Barger. Jan 80, 43p FCP-34F7024-F, FHWA-RD-79-100

Under current highway construction practices, aggregate gradation must be controlled to help insure the production of good pavements. This study was undertaken to determine what control procedures are being used in the United States and how incorporation of alternative testing methods would effect the adequacy of the control and the amount of time devoted to doing it. A survey of control practices currently being used was conducted under Phase 1 of this study. The results of that survey are summarized herein. Alternatives to the standard test methods of gradation determination were evaluated in Phase 2. They were compared with the standard tests in terms of total testing time required and the accuracy of the gradation results. The sources of variation in test results and the relative importance of each were also investigated. Recommendations are given as to the frequencies of sampling and gradation testing based on the study findings.

PB80-138175 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Interlaboratory Evaluation of the Cyclone Settled Density Test for Cellulosic Loose Fill Insulation.
Final rept.,
J. Randall Lawson. Dec 79, 21p NBSIR-79-1930
Sponsored in part by Consumer Product Safety Commission, Bethesda, MD. Textile and Mechanical Engineering Group.

The cyclone settled density test for cellulosic loose fill insulation was evaluated in an interlaboratory test program. Seven laboratories tested seven cellulosic loose fill insulations manufactured for the home insulation market. The participating laborattories were surveyed to evaluate the test apparatus and test methodology used at each location. The study indicated that there is reasonable assurance that test results on the same material obtained at one laboratory can be reproduced in one of the other laboratories.

PB80-143076 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
A Laboratory Investigation of Cold-Mix Recycled Bituminous Pavements.
Interim rept.,
Mang Tia. 12 Dec 78, 179p JHRP-78-23, FHWA-IN-JHRP-78-23
Sponsored in part by Indiana State Highway Commission, Indianapolis.

In this laboratory study, the effects of different factors on the properties of a cold-recycled asphalt mixture were investigated. The factors investigated were the amount and type of added binder, the amount of added moisture, the added virgin aggregate, the compactive effort and the curing time. A laboratory procedure for preparing and testing cold recycled mixtures was developed and used in the study. The study indicated that the Gyratory machine could be a potentially valuable tool in the evaluation of long time performance of recycled mixtures. A testing procedure for cold-recycled bituminous mixtures was recommended from the findings of this study.

PB80-144058 PC **A02**/MF **A01**
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Cement and Building Materials.
Discussion paper.
18 Oct 78, 21p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

The strategy for the development of building materials industries in developing countries is discussed. The contents of the document include a discussion of the problem; objectives; technological needs and alternatives; appropriate construction and planning techniques; research and development; policy implications:; and program of action.

PB80-805682 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Prestressed Concrete Technology (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Guy E. Habercom, Jr. Mar 80, 304p
Supersedes NTIS/PS-79/0174, NTIS/PS-78/0132, and NTIS/PS-77/0096. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-79/0175 and PB80-805690.

The physical and mechanical properties of prestressed concrete are investigated in these Government-sponsored research reports. Highway surfaces, highway bridges, and other concrete structures are reviewed. (This updated bibliography contains 297 abstracts, 20 of which are new entries to the previous edition.)

PB80-805690 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Prestressed Concrete Technology. Volume 2. February, 1978-January, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 78-Jan 80,
Guy E. Habercom, Jr. Mar 80, 119p
Supersedes NTIS/PS-79/0176, NTIS/PS-78/0133 and NTIS/PS-77/0097. For the companion Published Search of the NTIS Data Base, see PB80-805682. See also Volume 1, 1974-January, 1978, NTIS/PS-79/0175.

The physical and mechanical properties of prestressed and post tensioned concrete are investigated in these reports gathered in a worldwide literature survey. Highway bridges, highway surfaces, building members, reactor vessels, and miscellaneous concrete structures are reviewed. (This updated bibliography contains 112 abstracts, 38 of which are new entries to the previous edition.)

13D. Containers and Packaging

AD-A079 787/8 PC **A05**/MF **A01**
Army Armament Materiel Readiness Command Rock Island IL Decision Models Directorate
A Methodology for Evaluation of Ammunition Packaging/Containerization Alternatives on a Life Cycle Basis,
Thomas H. Short. Oct 79, 91p Rept no. DRSAR-DM-T907

The study was accomplished in two parts. Phase I, completed in February 1976, provided a review and assessment of relevant cost methodologies and data availability. Development of the methodology described herein occurred during Phase II. The methodology provides a viable and consistent framework for evaluation of ammunition/containerization on life cycle cost basis. Utility of the methodology is demonstrated by the evaluation of packaging configurations for the 2.75-Inch Rocket. Results of this demonstration are provided in Appendix E.

BTHE-030913 PC$142.00
British Standards Institution, Hemel Hempstead (England). Technical Help to Exporters.
VSR Collection; Design Calculations of Pressure Vessels.
c1979, 147p ISBN-0-905877-21-7
Trans. of Associazione Nazionale per il Controllo della Combustione (Italy), 1978.
Price to members $104.00.

This document presents technical specifications for use in design calculations of pressure vessels. These specifications are based on the Ministerial Decree of 21 November, 1972.

BTHE-030914 PC$192.00
British Standards Institution, Hemel Hempstead (England). Technical Help to Exporters.
S Collection; Use of Welding in the Manufacture and Repair of Pressure Vessels.
c1979, 205p
Trans. of Associazione Nazionale per il Controllo della Combustione (Italy), 1978.
Price to members $136.00.

The publication (the S Collection) contains the technical specifications applicable under the DM of 21 November 1972 which lays down standards for the manufacture of pressure vessels: (1) Provisions for design of various parts of pressure vessels; (2) Provisions on use of materials in pressure vessel manufacture and repair; (3) Provisions for use of welding in pressure vessel manufacture and repair; and (4) Provisions common to the preceding parts.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A079 920/5 PC **A05**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Ocean Engineering
Study of Residual Stresses and Distortion in Structural Weldments in High Strength Steels.
Technical progress rept. 1 Dec 77-30 Nov 79,
Vassilios J. Papazoglou, and Koichi Masubuchi.
30 Nov 79, 99p Rept no. 82558
Contract N00014-75-C-0459

Experimental results on temperature, strain and distortion during welding HY-130 steel are presented. The geometries include 1-inch thick plates and 0.75-inch cylindrical shells. Welding was performed using the gas metal arc, electron beam and laser processes. The experimental results are compared with predictions made by computer programs. Finally, through thickness distributions of residual--stresses obtained using the Rosenthal-Norton sectioning technique--are presented.

PB80-141732 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
Fatigue of Anchor Bolts.
Research rept. (Final),
Karl H. Frank. Jul 78, 48p CFHR-3-5-75-172-2F, FHWA/TX-78/05-172-2F
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

The behavior of anchor bolts used to anchor bridge elements, sign supports, luminaries, and other structures was examined under fatigue and static loading. One hundred and eighty specimens were tested. The report summarizes the results of all the tests performed and the significance of the variables investigated. The last section of the report contains design fatigue stress and anchor bolt specification recommendations.

13F. Ground Transportation Equipment

AD-A079 968/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Automation Institute, Warsaw College of Engineering, the Operating System of the Interface-Message Computer System for Traffic Control on the Central Railroad Trunkline,
Krzysztof Sacha. 15 Aug 79, 17p Rept no. FTD-ID(RS)T-0992-79
Edited trans. of Informatyka (Poland) v13 n3 p5-8 1978.

No abstract available.

PATENT-3 577 711 Not available NTIS
Department of Agriculture, Washington, DC.
Apparatus for Removing Entrained Particles from Gases.
Patent,
Luigi U. De Bernardo. Filed 2 Jun 69, patented 4 May 71, 10p PB80-133127, PAT-APPL-829 125
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus for removing entrained particles from gases, of particular use as a spark arrester with internal combustion engines, comprises, essentially, an elongated cylinder, closed at one end and having a spiral member secured to the inner wall. Exhaust gases enter tangentially at a point near the open end and travel in a thin layer along a spiral path adjacent the wall toward the closed end. Near the closed end, the gases reverse direction and travel in an axial spiral path along the center of the cylinder and out the open end, while incandescent carbon particles continue by inertia in their original spiral path and are retained or pulverized by rubbing against the cylinder wall as they continue to circulate at the base of the cylinder. The absence of baffles minimizes back pressure on the engine.

PB80-135312 PC **A16**/MF **A01**
California State Div. of Mass Transportation, Sacramento.
Rail Transit Criteria for System Review and Preliminary Design.
Final rept. Mar 76-Oct 79,
K. W. Hintzman, R. E. Kershaw, K. Y. Mori, C. L. Pearson, and E. Rogers. Dec 79, 374p 13200-631063, UMTA-CA/PD-78/1
Grants DOT-UMTA-CA-09-8001, DOT-UMTA-CA-09-8002

This report is a manual intended to assist in evaluating rail transit proposals and to provide information for preliminary design of trackways and to serve as a guide to the acquisition and use of data required for the final design of a specific system. The standards and characteristics of a number of operating and proposed systems were analyzed and organized to produce this manual. The first three chapters describe and contrast light and heavy rail systems, outline the system planning process, and discuss the implications of choices within systems. These chapters also describe vehicle and facility characteristics and requirements that affect trackway location and design. Finally, they discuss system operational factors and the magnitude and range of major cost elements. The last chapter contains principles, conventions and criteria for trackwork and for the preliminary design of trackways.

PB80-135387 PC **A06**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Analysis for Need for Passenger Safety Belt Requirements in Intercity Buses. Volume I: Text and Bibliography.
Final rept.,
Rickey L. Stansifer, Robert A. Romberg, Ralph L. Day, and Ronald W. Drahos. 30 Sep 77, 121p
Contract DOT-FH-11-9180
See also Volume 2, PB80-135395.

An analysis was performed to determine the need for passenger safety belt requirements in intercity buses. The analysis included an accident file review of all in-depth investigation reports involving intercity buses for the years 1972-1976 available from the BMCS and the NTSB; a review of all available literature, supplemented by interviews with industry representatives; an assessment of passenger injuries, reduction of injuries through the use of safety belts, seat performance, and bus construction; and a cost/benefit analysis comparing the cost to install safety belts to the benefits, in reduced injuries, received. It was found that none of the safety belt options considered demonstrated a favorable benefit/cost ratio at the anticipated voluntary passenger use rates of safety belts. Thus, requirements for passenger safety belts in intercity buses, as considered in this research project, are not recommended.

PB80-135395 PC **A13**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Analysis for Need for Passenger Safety Belt Requirements in Intercity Buses. Volume II: Appendices.
Final rept.,
Rickey L. Stansifer, Robert A. Romberg, Ralph L. Day, and Ronald W. Drahos. 30 Sep 77, 279p
Contract DOT-FH-11-9180
See also Volume 1, PB80-135387.

The appendices support the research done in Vol. 1 on the safety analysis of passenger safety belts for intercity bus usage.

PB80-135460 PC **A05**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Tri-Level Study: Modification Task 1: Final Report on Potential Benefits of Various Improvements in Vehicle Systems in Preventing Accidents or Reducing Their Severity.
Final rept. 28 Feb-30 Jun 77,
John R. Treat, and Robert A. Romberg. 30 Jun 77, 88p DOT-HS-034-3-535-T-1, DOT-HS-805 094
Contract DOT-HS-034-3-535
See also report on Task 3, PB80-118839.

A analysis was conducted to assess the potential accident prevention and severity reduction benefits of various possible improvements in vehicle systems. Based on a review of the literature and in consultation with NHTSA, 11 potential improvements and variations of these were defined for assessment. Benefits were assessed by having four members of IRPS' engineering staff manually review individual in-depth case reports to extract information needed for these assessments, and to hypothetically assess the benefits derived from equipping one or more of the vehicles in each accident with each of these systems. A total of 420 in-depth investigation reports were available for review. 'Possible' benefits recorded for the various systems ranged from a low of 0.5% (two accidents out of 420) for 'standardization of driver controls,' to a high of 8.8% (37 accidents) for 'improved brake lights.' The maximum 'certain' benefit (8 accidents) was for 'vehicle lifetime brake components,' which were also judged to be of 'possible' benefit in up to 5.5% of these accidents (23 of 420).

PB80-135478 PC **A05**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Tri-Level Study: Modification Task 2: Final Report on Driver/Vehicle Characteristics Related to Vehicle Condition and Causation and an Assessment of Indiana PMVI Effectiveness to Reduce the Frequency and Severity of Accident Causes by Vehicular-Related Malfunctions/Degradations.
Final rept. 28 Feb-30 Jun 77,
Stephen T. McDonald, and Robert A. Romberg. 30 Jun 77, 83p DOT-HS-034-3-535-T-2, DOT-HS-805 095
Contract DOT-HS-034-3-535
See also report on Task 1, PB80-135460.

Results of this study indicate that vehicle condition was significantly related to driver age, education, marital status, occupation, family income, driver education, and vehicle age and manufacture. The likelihood of vehicular causal involvement in accidents was related to driver age, vehicle age and vehicle body style. Concerning PMVI effectiveness, 51.7% of the components which were judged to be causally implicated in accidents were either not manditorily inspected through Indiana PMVI or if inspected were later judged to be in a failing condition at the time of state inspection. Of all components checked which were defective at the time of the accident, 28.9% were judged to be defective at the time of the state inspection.

PB80-135486 PC **A04**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Tri-Level Study: Modification Task 4: Final Report on the Relationships Between Driver Characteristics and Accident Causation.
Final rept. 28 Feb-30 Jun 77,
Stephen T. McDonald. 30 Jun 77, 63p DOT-HS-034-3-535-T-4, DOT-HS-805 096
Contract DOT-HS-034-3-535
See also report on Task 2, PB80-135478.

A analysis was conducted to determine if driver characteristics were related to factors which were judged to cause or increase the severity of accidents. Statisticial tests were employed to evaluate causation differences on the basis of driver trip plan, fatigue, number of passengers, age, driving experience, vehicle familiarity, and road area familiarity. Results indicate driver fatigue, trip plan, road area familiarity, number of passengers and age were related to factors which caused accidents. For males, vehicle familiarity and for females, driving experience were also related.

PB80-135528 PC **A06**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Mechanical and Aerospace Engineering.
Correlation of Braking System Defects and Performance Inspection. Volume II: Technical Report.
Final rept. 8 Jun 77-30 Jun 79,
J. W. Hodgson, and A. J. Edmondson. Jul 79, 117p DOT-HS-805-126
Contract DOT-HS-7-01621
See also Volume 1, PB80-117617.

In a previous study a low cost torsion bar brake dynamometer was developed. The present study reviewed the design of this brake tester, to suggest changes in the design, to construct two prototypes, and to conduct tests that would permit the prototypes to be evaluated against three commercially available testers. The commercially available testers used were a low speed roller, a high speed roller with inertia capability, and a platform tester. Evaluation criteria included accuracy, repeatability, ability to detect known defects, and cost. The results show that the prototype is ranked highest using the criteria listed. It is recommended that its long term durability be determined by placing it in service.

PB80-137334 PC **A07**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
The Measurement of Locomotive Noise at Existing Railroad Test Sites.
Final rept. Sep 78-Nov 79,
P. J. Remington, M. N. Alakel, J. W. Ernest, and N. R. Dixon. Nov 79, 139p DOT-TSC-FRA-79-17, FRA/ORD-79/55
Contract DOT-TSC-1474

A study was undertaken to examine the feasibility of accurately measuring the noise from locomotives at existing load cell sites in the absence of sites conforming with U.S. Environmental Protection Agency standards. It was found through measurments at seven typical sites and one conforming load cell test site involving ten locomotives that reasonably accurate measurements were possible for the locomotive operating fully loaded at throttle 8. Errors, when they occurred, were due primarily to sound reflecting off nearby buildings. Measurements with the locomotive in idle were generally difficult because of high background noise at these sites. A passby test procedure wasalso examined and found to provide reasonably accurate measurement of locomotive noise at throttle 8, full load.

PB80-137391 PC **A02**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Office of Passenger Vehicle Research.

Seat Belt Performance of Manual and Automatic Systems Installed in the GM and Chevrolet Chevette and the VW Rabbit.
Technical rept.,
John B. Morris. Dec 79, 11p DOT-HS-805-203
Prepared in cooperation with Dynamic Science, Inc., Phoenix, AZ., and Approved Engineering Test Labs., Fullerton, CA.

Tests of both manual and automatic seat belt equipped Chevrolet Chevettes and VW Rabbits have been conducted by the National Highway Traffic Safety Administration. The report reviews the test data and attempts to explain the reason for the difference in performance of the two (manual and automatic) seat belt systems.

PB80-137524 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Methods of Evaluating the Effect of Aerodynamics on the Fuel Consumption of Commercial Vehicles,
T. Williams, and D. Jacklin. c1979, 25p TRRL-SUP-481

Wind tunnel tests, full scale coast down tests, and extended road running have been compared as methods of evaluating the effectiveness of devices for reducing the aerodynamic drag of heavy commercial vehicles. Wind tunnel testing is recommended as the best method of examining basic aerodynamic effects. For the transport operator the best method is probably a road test comparing the performance of a modified vehicle and a similar unmodified one; in the USA a procedure has been recommended by RCCC/SAE. Coast down tests are not thought to be of very wide application; they are too susceptible to the effect of small variations in experimental conditions. (Copyright (c) Crown Copyright 1979.)

PB80-138043 PC **A08**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Mechanical Impedance Evaluations of the Kansas Test Track: Pretraffic and Posttraffic Tests.
Final rept. 1 Jun 73-1 Jun 75,
Stafford S. Cooper. Nov 79, 170p FRA/ORD-79/10
Contract DOT-AR-30025

The Kansas Test Track (KTT) was comprised of nine different track systems whose dynamic response was measured in two series of impedance tests. Pretraffic impedance testing was done in 1973, before the KTT was opened to traffic, and a second (posttraffic) test series was carried out in 1975 after the KTT had experienced premature failure in service. Results of these tests, presented in the form of impedance and velocity transfer ratio plots, have been used to characterize the various KTT track systems according to their initial dynamic stiffness and component behavior. Known limitations of the test apparatus precluded a detailed analysis; however, a linear idealization was developed to grossly model track system response. These results illustrate the feasibility of an impedance approach to the structure-ballast-interaction processes which govern tract system performance.

PB80-138316 PC **A07**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Postmortem Investigation of the Kansas Test Track. Volume I.
Final rept. 1 Jun 75-1 Jun 76,
Stafford S. Cooper, Albert J. Bush III, Homer C. Greer III, Mark A. Vispi, and Melvin M. Carlson.
Nov 79, 142p FRA/ORD-79/09.I
Contract DOT-AR-30025
See also Volume 2, PB80-138324.

The Kansas Test Track (KTT) was comprised of nine different track systems, which were built on a designed embankment. The KTT subgrade experienced premature failure in service, and KTT operations were terminated in June 1975 after six months of operation. A postmortem investigation of KTT was carried out in 1975 and 1976. Volumes I and II document the structure, ballast, and embankment studies carried out by the U. S. Army Engineer Waterways Experiment Station in the postmortem investigation. Results presented in Volume I provide needed insight into track system behavior and are particularly descriptive of ballast and embankment performance. A rationale is presented to explain the mechanism of failure in the subgrade, and attention is drawn to the structure-ballast-subgrade interaction processes which govern track system performance. Inadequate drainage of the top of the KTT embankment led to moisture content increases in the top of subgrade from 1971 to 1974, when traffic commenced. The embankment clay was moderately to highly plastic, and moisture-induced loss of strength in the top few inches of subgrade was the principal cause of failure.

PB80-138324 PC **A11**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Postmortem Investigation of the Kansas Test Track. Volume II.
Final rept. 1 Jun 75-1 Dec 76,
Stafford S. Cooper, Albert J. Bush III, Homer C. Greer III, Mark A. Vispi, and Melvin M. Carlson.
Feb 79, 231p FRA/ORD-79/09.II
Contract DOT-AR-30025
See also Volume 1, PB80-138316.

The Kansas Test Track (KTT) was comprised of nine different track systems, which were founded on a designed embankment. The KTT subgrade experienced premature failure in service, and KTT operations were terminated in June 1975 after approximately six months of traffic. A postmortem investigation of the KTT was carried out in 1975 and 1976. Results of this investigation are presented in two volumes. Summary data, analyses, conclusions, and recommendations are presented in Volume I. Volume II is comprised of five appendixes which document the equipment and procedure used, and data obtained in KTT structures, vibroseismic, penetrometer, trenching, and instrumentation testing.

PB80-138472 PC **A07**/MF **A01**
ORI, Inc., Silver Spring, MD.
Risk Assessment of Air Versus Other Transportation Modes for Explosives and Flammable Cryogenic Liquids. Volume I: Risk Assessment Method and Results.
Final rept.,
G. Kloeber, M. Cornell, T. McNamara, and A. Moscati. Dec 79, 147p ORI/TR-1552-VOL-1, DOT/RSPA/MTB-79/13
Contract DOT-RC-82036
See also Volume 2, PB80-138480.

This report describes a method for assessing the comparative risks of transporting hazardous materials by alternative routes and modes. The method is then applied to the transport of Class A explosives and liquid hydrogen between specific origin-destinations, testing the air-highway modal combination with alternative combinations of highway, rail, and marine modes. The risks were found to be highly route-dependent; however, for those routes selected, the air-highway modal combination showed generally lower risks. Rerouting and improvement in terminal operations showed the greatest opportunity for risk reduction.

PB80-138480 PC **A18**/MF **A01**
ORI, Inc., Silver Spring, MD.
Risk Assessment of Air Versus Other Transportation Modes for Explosives and Flammable Cryogenic Liquids. Volume II: Supporting Documentation.
Final rept.,
G. Kloeber, M. Cornell, T. McNamara, and A. Moscati. Dec 79, 419p ORI/TR-1552-VOL-2, DOT/RSPA/MTB-79/14
Contract DOT-RC-82036
See also Volume 1, PB80-138472.

This report presents a methodology for performing a comparative assessment of risks involved in the transport of hazardous materials over specific routes by alternative modes. The methodology is then applied to the transport of Class A explosives between six different origin-destinations and to the transport of liquid hydrogen over six different origin-destinations. In each case the risks associated with the transport by air are compared with various combinations of highway, rail, and marine modes. The risks associated with specific operational phases, with handling operations, and with demographic characteristics of specific routes are defined and quantified.

PB80-139934 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Inspection and Maintenance Staff.
Analysis of In-House I/M Testing of a Three-Way Chevrolet Citation and a Three-Way Dodge Aspen.
Technical rept.
Jan 80, 17p EPA-AA-IMS-ST-80-1

This report is an analysis of the effectiveness of I/M type 'short tests' in identifying grossly emitting vehicles. This report examines the question for two vehicles equipped with the technology to be introduced nationwide in 1981. This technology incorporates a high degree of engine control through the use of sensors, actuators and an on-board computer, and allows the simultaneous conversion of HC, CO and NOx in a three-way catalyst. In a testing program performed in-house, a 1980 Chevrolet Citation and a 1979 Dodge Aspen were selectively disabled to simulate possible in-use vehicle conditions. A wide range of testing was performed at each condition including FTP testing and I/M short tests. In this report, the FTP results will be compared to the results of two I/M tests to examine their effectiveness in identifying vehicles with gross FTP emissions. Each vehicle will first be discussed separately and then an overall comparison will be given. Full data sets for the two vehicles can be obtained from the reports referenced at the end of the report.

PB80-140015 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Results of Inspection/Maintenance Catalyst Tests on a 1975 Dodge Dart.
Technical rept.,
Edward Anthony Barth. Dec 79, 20p EPA-AA-TAEB-80-3

The purpose of the test program was to determine whether or not a car with an inactive catalyst could be made to pass I/M short tests through maladjustment of the engine idle mixture, idle speed, and initial timing. Exhaust emissions and temperatures were both measured for each maladjustment. The Federal Three Mode and Two Speed Idle Test were run for each vehicle test condition. In addition, the potential of catalyst diagnostic tests was investigated. For these tests the effect of disconnecting the air pump or a spark plug on exhaust emissions and temperatures was determined. These tests were performed in conjunction with the above emission and temperature mapping. This report presents the measured data of a short program designed to determine the ability of existing I/M scenarios to detect an inactive catalyst.

PB80-140403 PC **A13**/MF **A01**
Systems Control, Inc., Anaheim, CA. Environmental Engineering Div.
Motor Vehicle Inspection/Maintenance for the State of South Carolina.
Final rept.
Feb 79, 296p EPA/904/9-79/028A
Contract EPA-68-02-2536
See also PB-300 304.

This report presents an analysis of alternative motor vehicle basic inspection and maintenance programs in terms of related costs and benefits for the State of South Carolina with specific information covering Lexington, Richland, Charleston, and Berkley Counties. The study methodology used is described and includes collecting data, determining criteria for selecting alternative program configuration, screening program option and evaluating alternative configuration selected through the screening process. Program alternatives were evaluated in terms of emission reduction attainable, geographic coverage, effective motor vehicle population, consumer protection, quality assurance, costs and financial feasiblity.

PB80-140809 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of the FuelXpander.
Technical rept.,

Edward Anthony Barth, and James Kranig. 1980, 33p EPA-AA-TAEB-80-2

The FuelXpander is a retrofit device, marketed by FuelXpanders, Ltd. of Glen Falls, N.Y. It is designed to pre-heat the gasoline before it reaches the carburetor. The manufacturer claims the device improves fuel economy, safety and performance. The basic question asked was whether with a FuelXpander installed on an engine, will the fuel economy, on the average under different outside temperatures, increase, stay the same, or decrease.' It was in response to this request, that the TAEB agreed to test the FuelXpander. The conclusions drawn from the EPA evaluation tests are necessarily of limited applicability. A complete evaluation of the effectiveness of an emission control system in achieving performance improvements on the many different types of vehicles that are in actual use requires a much larger sample to test vehicles than is economically feasible in the evaluation test projects conducted by EPA. For promising systems it is necessary that more extensive test programs be carried out.

PB80-141039 PC **A03**/MF **A01**
Federal Highway Administration, Washington, DC. Traffic Systems Div.
Highway Sight-Distance Requirements: Truck Applications.
Final rept.,
Donald A. Gordon. Feb 79, 44p FHWA-RD-79-26

The report is concerned with problems of vehicle eye-height, with particular reference to trucks. The analysis indicates that the inferior braking of trucks on vertical curves is compensated for, on the average, by increased visibility due to raised eye-height. However, this is not true for the long stopping distances required in the case of heavily loaded trucks. In particular, the cab-under truck design, with eye-height barely above .91 meters does not have the visibility advantage of conventional trucks and consequently does not have any compensation for inferior braking ability. Passing zone markings, standardized for passenger cars, are not adequate for trucks. Trucks require 50 percent more distance than passenger cars to pass on two-lane roads. The higher eye-height advantage does not fully compensate on crest vertical curves, for the passing disadvantages. It is suggested that an explicit procedure be designated for determining the geometric design eye-height standard.

PB80-142441 PC **A16**/MF **A01**
STV, Inc., Pottstown, PA.
Evaluation of Signal/Control System Equipment and Technology. Task 3: Standardization, Signal Types, Titles.
Final rept. Oct 77-Dec 79,
S. F. Taylor, J. F. Marshall, C. M. Schultz, and R. B. Whalen. Dec 79, 358p FRA/ORD-78/39.3
Contract DOT-FR-773-4236
Prepared in cooperation with Dyer (Thomas K.), Inc., Lexington, MA., and Kentron International, Inc., Dallas, TX. See also Task 2, PB-299 891.

This report analyzes and summarizes current signal types and associated aspects, titles and indications employed by U.S. Railroads over which Amtrak operates as well as by several foreign railroads. A review of the historical development of signal technology is presented. The report concludes with recommended standards for signal types, aspects, titles and indications.

PB80-142839 PC **A04**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Tire-Dynamometer Roll Effects.
Technical rept.,
Richard N. Burgeson. Mar 78, 69p EPA-AA-LDTP-77-4

The Federal Government currently determines light-duty vehicle fuel economy and emissions on the twin small-roll dynamometer. The geometry of the dynamometer-vehicle system is one which cannot be duplicated under actual driving conditions because only the rear tires are placed on the dynamometer and the surface upon which they are placed is curved. Recently, questions have been raised as to the validity of the assumption that two tires on the dynamometer equals four tires on the road with regard to all tire construction types. However, it has been suggested that when radial tires are operated on the twin small-roll dynamometer they exhibit higher rolling resistance than the other construction types under the same conditions. Lack of information prompted an in-house investigation into the effects of the twin-small-roll dynamometer on tires.

PB80-142862 PC **A23**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Operation of Automated Guideway Transit Vehicles in Dynamically Reconfigured Trains and Platoons. Volume I. Part I. Applications Analysis. Part II. Vehicle Dynamics.
Final rept. Sep 76-Jul 79,
S. Shladover. Jul 79, 534p UMTA-MA-06-0085-79-2
Contract DOT-UT-80013
See also report dated Apr 79, PB-300 513.

This study shows that the passenger capacity of AGT systems may be significantly increased by operating vehicles in dynamically reconfigured trains or platoons. It is estimated that a minimum lane capacity of 5,000 to 10,000 passengers per hour is needed to make single-party AGT economically competitive with buses and that this capacity requires the use of trains. Trains also offer several non-capacity-related operational advantages. In this report, the longitudinal control systems needed to effect dynamic en/extrainment with platoon operations at spacings of 30-60 cm are developed with particular attention to stability, jerk limiting requirements, safety and passenger comfort. The capacity advantage of entraining is demonstrated for a single guideway link and for merge junctions, using Monte Carlo simulation. Variable-slot-length point-follower control is shown to reduce merge delays and maneuver ramp lengths compared with fixed-slot-length methods. The 'zero gap' merge scheme developed here produces dramatic improvements compared with conventional merge strategies. The study suggests that the concepts of dynamic entrainment and platooning deserve more detailed study and testing because of the significant advantages they offer.

PB80-142904 PC **A12**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Assessment of Risks and Risk Control Options Associated with Liquefied Natural Gas Trucking Operations from Distrigas Terminal, Everett, Massachusetts. Volume II. Appendices.
Final rept.
Jun 79, 274p ADL-82280-2, DOT/RSPA/MTB-79/10
Contract DOT-RC-82037
See also Volume 1, PB80-141757.

Contents:
- Trucking route descriptions;
- Accident experience data sources;
- Route data by mile in computer format;
- Hazard assessment models on spread and evaporation of a cryogenic liquid spilled on land;
- Description of a typical LNG semi-trailer;
- Descriptions of distrigas facility and truck loading procedure;
- General instructions to drivers and unloading procedures;
- Details of risk profile development.

PB80-142912 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Assessment of Risks and Risks Control Options Associated with Liquefied Natural Gas Trucking Operations from Distrigas Terminal, Everett, Massachusetts. Volume III. Comments and Responses on Draft Report.
Final rept.
Jun 79, 147p ADL-82280-3, DOT/RSPA/MTB-79/11
Contract DOT-RC-82037
See also Volume 2, PB80-142904.Color illustrations reproduced in black and white.

The report assesses the risks involved in LNG transportation by truck. Loading and unloading procedures are analyzed and route selections are investigated.

PB80-143092 PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Loran Position Determination in an Urban Environment: A Comparison of Three Techniques,
John S. Ludwick, Jr. Oct 79, 52p MTR-79W00356, UMTA-VA-06-0065-79-1
Contract DOT-UT-90006

The report documents the evaluation of three commonly used techniques for conversion of Loran time-difference-of-arrival measurements to position estimates. The comparison was designed to determine whether one particular technique was substantially superior with respect to accuracy performance and costs to the others and also attempts to ascertain which technique, if any, might be appropriate for a non-signpost random route application.

PB80-144124 PC **A07**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Technical Services Div.
School Buses.
Subject bibliography,
Lois Flynn. Dec 79, 142p DOT-HS-805 207, SB-39
See also PB-194 314.

The bibliography represents literature acquired since the establishment of the National Highway Traffic Safety Administration (NHTSA) concerning the handling, operation, and safety of school buses. It is comprised of NHTSA contract reports, reports of other organizations concerned with highway safety, and articles from periodicals in related fields. Citations follow the format used in the monthly abstract journal Highway Safety Literature and are indexed by a key-word-out-of-context (KWOC) listing, author, corporate author, contract number, and report number.

PB80-144827 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of Applicability of Inspection/Maintenance Tests on a Chevrolet Citation.
Technical rept.,
Thomas J. Penninga. Nov 79, 25p EPA-AA-TAEB-80-6

This report presents testing results which were gathered to determine the suitability of existing I/M testing scenarios on a Chevrolet Citation with a computer based emission control system. This car had a micro-processor based three-way catalyst control system. After suitable baselines were established, various components were made inoperative in the emission control system. Complete FTP, HFET, New York City Cycles, and I/M tests were run for each vehicle condition. This report presents the measured data taken during the tests.

PB80-145220 PC **A04**/MF **A01**
Chilton Co., Radnor, PA.
Light Duty Truck Characteristics, Historical Data Base.
Final rept. Mar-Nov 77,
C. Cantwell. Dec 79, 60p DOT-HS-804 787, DOT-TSC-NHTSA-79-37
Contract DOT-TSC-1338

The report is a collection of data concerning physical, operating, performance, and market characteristics of light duty trucks for the model years 1972 and 1975 thru 1977. The data is stored on tape in DOT/TSC DEC System 10 computer system. Information was collected from published and unpublished sources with extrapolation and correlations being made when raw data was not available. Vehicles are reported by model year and grouped by manufacturer using production volume, model, body type, engine displacement, transmission and GVWR class attributes as criteria to select representative vehicle configurations. Characteristics are documented for vehicles representative of total U.S. sales of domestic and imported light duty trucks for the model years indicated.

PB80-149172 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor.
The Rolling Resistance of Pneumatic Tires.
Final rept.,
S. K. Clark, and R. N. Dodge. Dec 79, 72p DOT-TSC-NHTSA-79-28, DOT-HS-804 523

Contract DOT-TSC-1031
Prepared in cooperation with National Highway Traffic Safety Administration, Washington, DC. Office of Research and Development. See also report for May-Jul 74, PB-242 985.

The report illustrates the important variables which affect passenger car tire rolling resistance. The influence of speed, load and inflation pressure is discussed, and test data is presented on the influence of these. The test data encompasses a wide variety of modern tires, bias and radial, over a range of rim diameters and tire aspect ratios. Measurements of tire rolling resistance are discussed and equations presented for converting rolling resistance gotten on drums to the equivalent value on the road.

13G. Hydraulic and Pneumatic Equipment

AD-A079 654/0 PC **A06**/MF **A01**
Oklahoma State Univ Stillwater Fluid Power Research Center
Wear in Fluid Power Systems.
Final rept. 1 Jul 78-30 Jun 79.
30 Nov 79, 122p ONR-CR169-004-2
Contract N00014-75-C-1157

Contaminant wear is one of the critical factors in component life and reliability. Therefore, the detection and analysis of this wear is extremely important. In this study, it was determined that ferrography is an effective tool for this detection and analysis. A theortical method was developed by which the behavior of both magnetic and non-magnetic particles in the fluid stream on the ferrogram can be predicted. This method indicates that very few magnetic particles will not be deposited on the ferrogram. This was verified experimentally. Tests were conducted on gear pumps, a hydrostatic transmission, and complete hydraulic system to verify the effectiveness of the ferrographic technique. These tests showed that changes in the wear rate of a system or component could be readily detected by the ferrograph. The lack of standardization of ferrographic procedures is delaying the acceptance of the ferrograph as a critical decision making instrument. A very advanced draft procedure has been prepared and is ready for consideration by the appropriate committee of the Society of Automotive Engineers. (Author)

13H. Industrial Processes

AD-A079 894/2 PC **A14**/MF **A01**
Army Armament Research and Development Command Dover NJ Technical Support Directorate
Manufacture of Army Helmet Molds by Numerical Control.
Technical rept.,
Donald O'Connor. Nov 79, 316p ARTSD-TR-79003, AD-E400 377

This report documents the development of numerically controlled machine tapes for use in the manufacture of helmet molds for the Army's new Kevlar helmet. The FMILL computer program was used to develop surfaces, and CDC's APT and APTLFT were used in the actual surface machining.

AD-A080 057/3 PC **A05**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Cathodic Protection of Civil Works Structures.
Final rept.,
Ashok Kumar, R. Lampo, and F. Kearney. Dec 79, 77p Rept no. CERL-TR-M-276

This report lists various design considerations for cathodic protection systems and provides several examples of such systems. It also contains the results of field surveys of U.S. Army Corps of Engineers (CE) installations which have used or are using cathodic protection on hydraulic structures. These surveys indicate that (1) graphite slab anodes can be softened by oxygen attack, (2) unprotected sausage anodes are often damaged by river debris, and (3) button anodes resist river debris and ice damage; button anodes examined during the survey were found to have performed well over a period of 7 years. In addition, it was determined that the current requirement for cathodic protection of 1 sq ft (0.092 sq m) of bare steel in aerated water is 2 mA/sq ft (22 mA/sq m). However, since cathodic protection current increases with water velocity, a square root dependence was measured using a cylindrical specimen rotating at a surface velocity of up tp 4 ft/s (1.2 m/s). Finally, it was determined that platinized anodes have a good potential for application in impressed-current cathodic protection systems. (Author)

AD-B008 190/1 PC **A06**/MF **A01**
Northrop Corp Hawthorne Calif Aircraft Div
Development of Corrosion Resistant Surface Treatments for Aluminum Alloys for Spot-Weld Bonding.
Final rept. 1 Feb 74-1 Feb 75,
B. B. Bowen, R. E. Herfert, and K. C. Wu. Mar 75, 125p NOR-75-51, AFML-TR-75-69
Contract F33615-74-C-5027
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The objective of this program was to develop a corrosion resistant spot-weld bonding system for aluminum aircraft primary structures. Anodizing and chemical surface treatment were investigated. Chemical and microscopic techniques indicated that the most suitable corrosion resistant surface on aluminum should be a boehmite surface, alpha Al2O3.H2O. Many anodizing and chemical treatment systems were able to produce this surface oxide; however, most of these systems produced surfaces that either showed poor corrosion resistance or could not be spot-welded. A treatment consisting of the standard FPL etch followed by 90-minute sealing in boiling sodium dichromate solution gave a weldable surface with good corrosion resistance. The best adhesive found was B.F. Goodrich A-1396B. This adhesive was modified by incorporating ZnCrO4 and SrCrO4 to make it more corrosion resistant. The addition of 3% by weight SrCrO4 was found to give an adhesive that could be welded through and had improved corrosion resistance over the unmodified adhesive. The selected spot-weld bonding system is FPL etch with 90-minute dichromate seal and the modified A-1396B adhesive. Tests indicate that this spot-weld bonding system has the strength and corrosion resistance of the best corrosion resistant adhesive systems currently available. (Author)

AD-B016 343/6 PC **A07**/MF **A01**
Carnegie-Mellon Inst of Research Pittsburgh PA
Establishment of a Plasma Melting Manufacturing Process for Production of Nickel-Base Alloys.
Final rept. 15 Jun 71-30 Sep 74,
G. K. Bhat. May 75, 128p AFML-TR-75-80
Contract F33615-71-C-1681
Distribution limitation now removed.

Plasma melting equipment of production scale was established by modification of an existing nonconsumable electrode melting facility. A 1.2 megawatt power capability plasma torch was operated up to a power level of 600 KW and several melts were made using nickel base alloy and titanium alloy scrap. The argon gas plasmarc has been shown to be a useful high heat source for melt-consolidation of super alloy and types of scrap including reactive metal scrap into suitable electrode shapes for subsequent consumable remelting. (Author)

N80-16340/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Tribological Properties of Silicon Carbide in Metal Removal Process.
K. Miyoshi, and D. H. Buckley. 1980, 18p NASA-TM-79238
Conf-to Be Presented at Intern. Symp. On Metal Working Lubrication, San Francisco, 18-19 Aug. 1980; Sponsored by Asme.

Material properties are considered as they relate to adhesion, friction, and wear of single crystal silicon carbide in contact with metals and alloys that are likely to be involved in a metal removal process such as grinding. Metal removal from adhesion between sliding surfaces in contact and metal removal as a result of the silicon carbide sliding against a metal, indenting into it, and plowing a series of grooves or furrows are discussed. Fracture and deformation characteristics of the silicon carbide surface are also covered. The adhesion, friction, and metal transfer to silicon carbide is related to the relative chemical activity of the metals. The more active the metal, the higher the adhesion and friction, and the greater the metal transfer to silicon carbide. Atomic size and content of alloying elements play a dominant role in controlling adhesion, friction, and abrasive wear properties of alloys. The friction and abrasive wear (metal removal) decrease linearly as the shear strength of the bulk metal increases. They decrease as the solute to solvent atomic radius ratio increases or decreases linearly from unity, and with an increase of solute content. The surface fracture of silicon carbide is due to cleavages of 0001, 10(-1)0, and/or 11(-2)0 planes.

PAT-APPL-6-061 350 PC **A02**/MF **A01**
Department of the Navy Washington DC
A Laser/Ultrasonic Welding Technique.
Patent Application,
Michael M. Farrow. Filed 23 Jul 79, 8p AD-D006 811/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides a non-contact laser/ultrasonic welding technique for strengthening the common laser weld by the addition of the ultrasonic cavitation and cleaning. A high powered laser applies heat to a weld joint to produce a melt. The output of the laser, or a second laser, is amplitude modulated to generate acoustic waves in the melt. The improved interdiffusion of the melt and the homogeneity of the weld joint result in an improved quality laser weld. Therefore, it is an object of the present invention to provide an improved quality laser weld joint with a non-contact welding technique.

PATENT-4 181 590 Not available NTIS
Department of the Air Force Washington DC
Method of Ion Plating Titanium and Titanium Alloys with Noble Metals and Their Alloys.
Patent,
Shiro Fujishiro, and Daniel Eylon. Filed 12 Sep 78, patented 1 Jan 80, 3p AD-D006 834/6, PAT-APPL-941 714
Supersedes PAT-APPL-941 714-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Components fabricated from titanium and titanium alloys are subjected to anion plating with noble metals or their alloys. The structures so treated are highly resistant to oxidation at elevated temperatures and possess improved mechanical properties. (Author)

PB80-133572 PC **A03**/MF **A01**
SRI International, Menlo Park, CA. Artificial Intelligence Center.
Programmable Industrial Automation.
Technical note,
David Nitzan, and Charles A. Rosen. Jul 76, 37p TN-133, NSF/RA-761805
Grant NSF-GI-38100

Important aspects of programmable automation are reviewed. Programmable industrial automation can help meet the socioeconomic needs for increased productivity and job enrichment in labor-intensive industries. Characterized by production flexibility and ease of set-up for new products, programmable automation is especially adaptable to manufacturing a variety of products in variable lot sizes at mass-production costs. Programmable, automated hardware/software systems existing in industry today include numerical control of machine tools, computer-aided design and manufacturing, production information and control, and industrial robots. These systems are being advanced by ongoing R & D activities; one major activity entails the application of robots with sensors to material-handling, inspection, and assembly operations. The ultimate goal of programmable automation is an essentially unmanned, computer-integrated automatic factory.

PB80-140668 PC **A10**/MF **A01**
Cornell Univ., Ithaca, NY. Coll. of Engineering.

Computer-Aided Injection Molding System.
Progress rept. no. 6, 1 Sep 78-31 Aug 79,
K. K. Wang, S. F. Shen, C. Cohen, C. A. Hieber, and A. I. Isayev. Sep 79, 215p
Grant NSF-DAR78-18868
See also Progress rept. no. 5 dated Sep 78, PB-288 283.

As part of a comprehensive program to develop a scientific base for the injection-molding process, progress is reported on development of an integrated computer program for mold design and manufacture and the simulation and production of optimum process controls. A systematic and unified approach is described for modeling the filling, packing, and cooling stages of the injection-molding process as well as for delineating the distinguishing characteristics of these stages. An investigation of viscoelastic modeling of the filling and cooling stages is reported, together with the finite-element/finite difference inelastic cavity-filling simulation. In both studies, the predictions compared favorably with experimental values obtained. Further work is described on modeling the 'fountain effect' problem with the pressure drop in cold runners and on the viscoelastic modeling of pressure losses in juncture and gate regions. Research has been initiated to develop a simplified model for molecular orientation. Preliminary studies of residual stresses and mechanical properties of molded parts are described as are proposed experiments involving flow birefringence and birefringence in molded parts. Progress in developing an automated mesh generation program for cavity-filling simulation is summarized.

PB80-805971 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electron Beam Welding. Volume 2. 1977-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Feb 80,
William E. Reed. Mar 80, 104p
Supersedes NTIS/PS-79/0156, NTIS/PS-78/0184, and NTIS/PS-77/0156. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-78/0185 and PB80-805989. See also Volume 1, 1964-1976, NTIS/PS-79/0155.

Development, automation, and applications of electron beam welding are presented in these Federally-sponsored research reports. Properties of electron beam welds and weldability of steel, aluminum, refractory metals, heat resistant alloys, and corrosion resistant alloys are included. (This updated bibliography contains 97 abstracts, 17 of which are new entries to the previous edition.)

PB80-805989 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electron Beam Welding. Volume 2. 1977-February, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1977-Feb 80,
William E. Reed. Mar 80, 185p
Supersedes NTIS/PS-79/0157, NTIS/PS-78/0186, and NTIS/PS-77/0157. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-79/0155 and PB80-805971. See also Volume 1, 1974-1976, NTIS/PS-78/0185.

Reports from worldwide research are cited covering the process, automation, equipment, and applications of electron beam welding. Properties and weldability of steel, aluminum, titanium, refractory metals, and heat resistant alloys are included. (This updated bibliography contains 178 abstracts, 37 of which are new entries to the previous edition.)

PB80-806052 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Energy Rate Forming: Ultrasonic, Electromagnetic, Pneumatic, and Hydraulic Forming (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
William E. Reed. Mar 80, 103p
Supersedes NTIS/PS-79/0242, NTIS/PS-78/0067, and NTIS/PS-77/0036.

The bibliography covers the use of ultrasonic, electromagnetic, pneumatic, and hydraulic energy. Cited reports include research on forging, extrusion, deformation, dies, and equipment. (This updated bibliography contains 96 abstracts, 4 of which are new entries to the previous edition.)

PB80-806060 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Energy Rate Forming: Explosive Forming (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
William E. Reed. Mar 80, 164p
Supersedes NTIS/PS-79/0243, NTIS/PS-78/0068, and NTIS/PS-77/0037.

The bibliography covers reports on material removal, forging, extrusion, and bonding by explosive forming. Analytical and experimental studies on various aspects of explosive metal working are included. (This updated bibliography contains 157 abstracts, 3 of which are new entries to the previous edition.)

13I. Machinery and Tools

AD-A079 542/7 PC **A07**/MF **A01**
Michigan Technological Univ Houghton Dept of Mechanical Engineering
Performance Testing of Twist Drills on AISI 4140 Alloy Steel.
Final rept.,
C. H. Kahng. Jul 79, 127p SARRI-EN-79-02
Contract DAAF01-70-C-0303

Performance testing of twist drills on AISI 4140 alloy steel was conducted by measurement of drill geometrics, drilling forces, drill wear, chip formation, and geometrical accuracy, and surface finish, of drilled holes. Major investigations were conducted using 1/2 inch diameter, H.S.S., taper-shank drills, of three manufactures, having six different, standard and special, geometrics. A dynamometer was designed and constructed to measure the drilling thrust, tongue and radial forces; and, effects of cutting conditions on drilling forces, and sources of force variations, were analyzed. Drill wear was studied by photographs of wear progress. Wear on drill lips and chisel edges was visually detectable when using a cutting fluid; however, built-up-edge (BUE) predominated when drilling dry. An extensive study was made of drilled hole accuracies in size, straightness, roundness and concentricity. Criteria for determining and controlling drill life are discussed in terms of the measurements made, differences in drills, and drilling speeds. (Author)

AD-B007 253/8 PC **A04**/MF **A01**
Battelle Columbus Labs Ohio
Investigation of Cage and Bearing Instability in Despun Antenna Bearings Due to Changes in Lubricant Properties.
Summary rept. no. 1, 1 Feb 74-31 Jan 75,
J. W. Kannel, S. S. Bupara, and C. J. Pentlicki.
Apr 75, 67p AFML-TR-75-38-Pt-1
Contract F33615-74-C-5012
Distribution limitation now removed.

A computer program is being developed for the purpose of investigating cage and bearing instability in a despun antenna bearings. The program utilizes empirical inputs to ensure accuracy of the analytical modeling and comparison with experimental cage-dynamics data are being made to validate the computer predictions. As a result of the experimental and analytical studies conducted thus far, a stability criterion is being postulated. One form of this criterion, denoting the state of stability of the system, can be written as D sub p = 4 C sub mu to the 2nd power/m sub e C sub S where c sub mu related to lubrication parameters, M sub e is the effective cage mass, and C sub s is a cage material-geometry parameter. If D sub p is less than unity, the cage is predicted to be stable. Conversely, if D sub p is greater than unity, an instability should occur. (Author)

N80-16337/1 PC **A07**/MF **A01**
Northwestern Univ., Evanston, IL.
Thermal Elastohydrodynamic Lubrication of Spur Gears.
Final Report.
K. L. Wang, and H. S. Cheng. Feb 80, 137p
NASA-CR-3241
Contract NGR-14-007-084

An analysis and computer program called TELSGE were developed to predict the variations of dynamic load, surface temperature, and lubricant film thickness along the contacting path during the engagement of a pair of involute spur gears. The analysis of dynamic load includes the effect of gear inertia, the effect of load sharing of adjacent teeth, and the effect of variable tooth stiffness which are obtained by a finite-element method. Results obtained from TELSGE for the dynamic load distributions along the contacting path for various speeds of a pair of test gears show patterns similar to that observed experimentally. Effects of damping ratio, contact ratio, tip relief, and tooth error on the dynamic load were examined. In addition, two dimensionless charts are included for predicting the maximum equilibrium surface temperature, which can be used to estimate directly the lubricant film thickness based on well established EHD analysis.

N80-16341/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Analysis of Wear-Debris from Full-Scale Bearing Fatigue Tests Using the Ferrograph.
W. R. Jones, and S. H. Loewenthal. 1980, 22p
NASA-TM-81403, E-9827
Conf-Prepared for Presentation at the Ann. Meeting of the AM. Soc. Of Lubrication Engr., Anaheim, Calif., 5-8 May 1980.

The ferrograph was used to determine the types and quantities of wear particles generated during full-scale bearing fatigue tests. Deep-groove ball bearings made from AISI 52100 steel were used. A MIL-L-23699 tetraester lubricant was used in a recirculating lubrication system containing a 49 mm absolute filter. Test conditions included a maximum Hertz stress of 2.4 GPa, a shaft speed of 15,000 rpm, and a lubricant supply temperature of 74 C (165 F). Four fatigue failures were detected by accelerometers in this test set. In general, the ferrograph was more sensitive (up to 23 hr) in detecting spall initiation than either accelerometers or the normal spectrographic oil analysis. Four particle types were observed: normal rubbing wear particles, spheres, nonferrous particles, and severe wear (spall) fragments.

N80-16342/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Performance of Computer-Optimized Tapered-Roller Bearings to 2.4 Million Dn.
R. J. Parker, S. I. Pinel, and H. R. Signer. 1980, 29p NASA-TM-81414, E-332
Conf-Proposed for Presentation at the Intern. Lubrication Conf., San Francisco, 18-21 Aug. 1980; Sponsored by Asme and the AM. Soc. Of Lubrication Engr.

The performance of 120.65 mm bore high speed design tapered roller bearings was investigated at shaft speeds to 20,000 rpm under combined thrust and radial load. The test bearing design was computer optimized for high speed operation. Temperature distribution and bearing heat generation were determined as a function of shaft speed, radial and thrust loads, lubricant flow rates, and lubricant inlet temperature. The roller bearing operated successfully at shaft speeds up to 20,000 rpm under heavy thrust and radial loads. Cup cooling was effective in decreasing the high cup temperatures to levels equal to the cone temperature.

PAT-APPL-6-084 274 PC **A02**/MF **A01**
Department of the Navy Washington DC
A Flexure Mounted Gimbal Support Assembly.
Patent Application,
Albert Himy. Filed 10 Oct 79, 13p AD-D006 899/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to gimbal support assemblies, and more particularly to a flexure mounted gimbal support assembly which provides a low rotational stiffness over limited angles. (Author)

PATENT-4 174 937 Not available NTIS
Department of the Interior, Washington, DC.

Powder Agglomerator and its Method of Use.
Patent,
Danton L. Paulson, and Robert B. Worthington.
Filed 15 Sep 78, patented 20 Nov 79, 4p PB80-139181, PAT-APPL-942 834
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A powder agglomerator and its method of use are disclosed. The invention is used to take extremely fine flue dust particles in a collection bin and process them before sending the resultant agglomeration to storage or a further processing location. From its collection bin, the dust particles are discharged by gravity upon a lower rapidly rotating smooth horizontal disc. The bin discharge is offset slightly from the disc's center so that the particles are subjected to centrifugal force to move them to the disc's outer periphery. At the point where the particles are discharged on the disc, a liquid binder, like water, is sprayed on the particles to cause them to begin to agglomerate. After being sprayed, the wetted particles are agglomerated under the influence of centrifugal and tangential forces. When they reach the disc's raised edge, the particles are completely agglomerated at which time they fall over the edge into a discharge hopper located below.

PATENT-4 175 471 Not available NTIS
Department of the Navy Washington DC
Cutting Apparatus and Vertical Drive Mechanism Therefor.
Patent,
John F. Wilger, Gregory S. Nakano, Tadao Uyetake, Stephen Orillo, Jr., and Teikichi Higa.
Filed 19 Dec 77, patented 27 Nov 79, 9p AD-D006 869/2, PAT-APPL-861 911
Supersedes PAT-APPL-861 911-77, AD-D004 961.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a cutting apparatus with a vertical drive mechanism for in place machining of a valve seat which may include an annular turntable adapted to be rotatably mounted on the valve above the valve seat. A feed shaft is mounted through the turntable so as to be rotatable therewith, and a bottom of the feed shaft is adapted to receive a cutter for machining the valve seat. The vertical drive mechanism is mounted on the feed shaft and includes a nut threaded in the feed shaft and a gear combination. The gear combination may include a first portion which is fixedly connected to the nut, a second portion which operatively engages the first gear portion, and a third portion which operatively engages the second gear portion, the third gear portion being mounted for rotatable slidable friction engagement about the nut. With this arrangement, rotation of the turntable causes the vertical drive mechanism to rotate therewith as a unit, however, upon stopping the third gear portion, the latter will rotate relative to the turntable and the remainder of the vertical drive mechanism to turn the second gear portion then the first gear portion, then the nut then drive the feed shaft vertically. (Author)

PB80-139017 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. Engineering Experiment Station.
Description of the Example Flat Rolled, Sheet, Strip Steel Plant Used in the Steel Project,
Lawrence C. Long. Sep 77, 40p 105, NSF/RA-770349
Grant NSF-APR73-07822
Also pub. as Purdue Univ., Lafayette, IN. Engineering Experiment Station Bulletin-143-Ser. Prepared in cooperation with Steel Industry Advisory Committee.

The steel mill described in this report provides a source of reference for the project on Systems Engineering of Computer Control Systems for Large Industrial Steel Complexes. The set of Rules and Assumptions used in specifying the Basic Plant are listed and the major flow of steel in the Plant itself is outlined. The author shows the relationship of the several process units of the plant, as broken down for the application of hierarchical computer control, to this particular plant. Outlines are provided of the sizes, operating ranges, physical process limitations of each of the plant units in the example strip sheet steel mill considered here. Plant operating limitations and rules which will strongly affect the plant scheduling operation are presented. Outlines are provided of the basic information concerning the plant's order book while the chosen limit of plant in-process inventories at the several plant locations are given. The plant as described here closely resembles the flat rolled, sheet, strip steel portion of ARMCO's Middletown, Ohio works.

13J. Marine Engineering

AD-A079 801/7 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Estimation of Wave Transmission Coefficients for Permeable Breakwaters.
Coastal engineering technical aid,
William N. Seelig. Oct 79, 24p Rept no. CERC-CETA-79-6

The Madsen and White (1976) analytical model of wave transmission through permeable breakwaters is combined with a wave transmission by overtopping formula to provide a method of predicting wave transmission coefficients for permeable breakwaters. Comparison of this combined prediction technique with physical model laboratory tests shows that the technique is useful for estimating transmission coefficients for design. A computer program was found the most convenient method of making predictions. The computer program and an example showing program use are included in an Appendix. (Author)

AD-A079 810/8 PC **A02**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Aerospace and Ocean Engineering
The Effects of Pitching Rate on the Hydrodynamic Properties of Hydrofoils,
Mark C. Hyman. Oct 79, 8p Rept no. VPI-AERO-100
Contract N00024-78-C-5610
Presented at the AIAA/SNAME Conference on Advanced Marine Vehicles (5th), Baltimore, MD, 3 Oct 79.

Little or no test data is available to verify theory predicting lift, drag and pitching moment of a hydrofoil in the presence of pitching motion commonly encountered in hydrofoil craft. The present paper presents the results of a wind tunnel investigation of the effects of pitching motion on two hydrofoil configurations. The results are compared to prediction techniques given in the U.S.A.F. DATCOM (Ref. 1). Finally, a verified force and moment prediction technique is presented. (Author)

AD-A079 955/1 PC **A04**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
The Influence of Wake Pattern on the Rudder Force of a Ship Model in a Deep Sea,
N. Matheson. Apr 79, 55p Rept no. ARL/AERO NOTE-389

The results of wind tunnel tests are given which were aimed at overcoming a steering problem on a 33000 tonne bulk carrier. The ship, as originally built, suffered from vibration and cavitation problems caused by the propeller working in non-uniform flow. A propeller tunnel had been fitted which satisfactorily overcame these problems, but it made the ship much less manoeuvrable, especially at low speed in shallow water. It was considered that vortex generators could offer an alternative to the propeller tunnel for improving the flow into the propeller without introducing any adverse affects on the steering. Several vortex generator sets were evolved which increased the sideforce produced by the rudder, by up to 44%, but none of them produced an equal or more uniform velocity distribution of the flow into the propeller compared with the tunnel. Since the most important requirement was to eliminate vibration and cavitation, it was concluded that the propeller tunnel could not be replaced by vortex generators. (Author)

AD-B002 869/6 PC **A04**/MF **A01**
Naval Ship Research and Development Center Bethesda MD
Submarine System for Logistics and Replenishment.
Research and development rept.,
Stephen T. W. Liang. Feb 75, 54p Rept no. NSRDC-4504
Distribution limitation now removed.

This report examines the technical feasibility of submarine alternatives to surface-borne cargo transport. Beginning with gross statements of potential missions and mission requirements, the study derives submarine concepts of transporting military loads which are assumed packaged in standard commercial containers. Submarines of conventional and tug-barge configurations are examined and estimates made of speed-power performance near the surface, dynamic stability and control, surfaced motions and seaway loads. Several cross-sectional hull and structural geometries are examined for structural adequacy and weight. Possible weight allocations for a submarine cargo ship are presented. Results of this preliminary feasibility investigation indicate that the concept of a cargo-carrying submarine may be technically feasible. It is found, however, that the transport efficiency of the submarine container cargo ship is significantly lower than that of a surface ship, and that unless other factors, such as attrition are considered, there is little incentive to consider submarine cargo transport. (Author)

AD-B018 764/1 PC **A04**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Central Instrumentation Dept
Infrared Thermometry and the Telatemp 44 as a Ship System Maintenance Monitoring Tool.
Departmental rept.,
Barry L. Zimmerman. May 77, 71p Rept no. CID-77-2
Distribution limitation now removed.

Results of a laboratory investigation have demonstrated that infrared thermometry is a promising technique for measuring surface temperatures of Navy shipboard equipment and systems. Certain problems are encountered when applying the technique. These problems in general are discussed. A specific infrared device, the Teletemp Corp. Model 44, was evaluated. It substantially meets all its advertised specifications and with certain recommended modifications, should prove a valuable tool for shipboard thermometry. (Author)

PB80-134240 PC **A02**/MF **A01**
Texas Antiquities Committee, Austin. Underwater Archeological Research Section.
The 'Flota' Disaster of 1554,
J. Barto Arnold, III. Jan 78, 10p TXAC/UARS-78/2, TAC/TR-28
Proceedings of the Conference on Underwater Archeology (9th) Held at San Antonio, Texas on January 3-8, 1978.

On April 29, 1554, three of four Spanish naos carrying treasure from Mexico to Spain were wrecked in a storm on Padre Island in present day south Texas. Results of two seasons of excavations and five years of research on one of these wrecks by the Underwater Archeological Research Section of the Texas Antiquities Committee are presented. Also considered are the results of historical research including translations of voluminous historical documents on the incidents recovered from the archives in Spain and elsewhere. Also included will be technical details of the analysis of the artifacts recovered.

PB80-134398 PC **A03**/MF **A01**
Texas Antiquities Committee, Austin. Underwater Archeological Research Section.
Concerning Underwater Remote Sensing Surveys, Anomalies, and Ground Truthing,
J. Barto Arnold, III. Jan 80, 36p TXAC/UARS-80/2, TAC/TR-45
Proceedings of the Conference on Underwater Archaeology (11th) Held at Albuquerque, New Mexico on January 8-11, 1980.

The purpose of the paper is to briefly discuss and compare marine remote sensing surveys conducted for research purposes with those conducted for cultural resource management purposes. Examples of anomalies from Texas waters that have been ground truthed are then illustrated and dis-

cussed. Included are anomalies caused by shipwrecks both modern and historic, isolated ferrous objects, and pipelines and well sites.

PB80-139314 PC **A04**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Davidson Lab.
Analysis of the Maneuvering Characteristics of Great Lakes Ships in Critical Channels. Phase I Report.
Final rept. Oct 78-Apr 79,
Haruzo Eda, and Frank DeBord. Apr 79, 65p SIT-DL-79-9-2057, MA-RD-940-80009
Contract DO-A01-78-00-3083

Results of the first phase of this study are presented relative to a two-phase program in which the maneuvering characteristics of Great Lakes ships in critical channels will be examined. The purpose of the first phase was to identify specific problem situations in terms of channels, vessel types, design variables and operational variables. Results obtained in the Phase 1 study include data collected through interviews with personnel from industry, analyses of the physical characteristics of waterways, traffic level projections, and analysis of historical damage records. Specific problem situations are identified in terms of channels, vessel types, and variables. Recommendations concerning the Phase 2 program are also included in this report relative to model tests, full-scale trials, and digital simulation studies.

PB80-141500 PC **A05**/MF **A01**
Inter-Governmental Maritime Consultative Organization, London (England).
Report on Feasibility Study on Reception Facilities for Selected Ports in a Special Area - Mediterranean. Volume I. General,
G. C. Steinman, M. P. Guerin, J. P. Longe, and C. L. Montfort. Sep 79, 99p MA-SC-700-80019
Prepared in cooperation with United Nations Environment Programme, New York. See also Volume 2, PB80-141518.
Also available in set of 3 reports PC E15, PB80-141492.

The report covers a joint IMCO/UNEP study of 73 ports in the Mediterranean Sea to determine the need for reception facilities in these ports for handling oily wastes from ships. The objective of the study was to provide assistance to countries in the Mediterranean Sea to meet the requirements for reception facilities in special areas as prescribed under Regulation 12 of Annex I of the 1973 International Convention for the Prevention of Pollution from ships. Certain ecologically sensitive regions, such as the Mediterranean Sea have been designated by the 1973 Convention as 'special areas' in which any discharge of oil into the sea is prohibited. The provision of adequate reception facilities in the 'special areas' is one of the critical requirements toward achieving the goal of the 1973 Conventions, i.e. complete elimination of intentional pollution and the minimization of accidental spills. The report is published in three volumes; Vol. I - General, contains general observations and recommendations.

PB80-141518 PC **A11**/MF **A01**
Inter-Governmental Maritime Consultative Organization, London (England).
Report on Feasibility Study on Reception Facilities for Selected Ports in a Special Area - Mediterranean. Volume II. Reports on the Countries and Ports Visited: Algeria, Cyprus, Egypt, France, Greece, Israel, Italy,
G. C. Steinman, M. P. Guerin, J. P. Longe, and C. L. Montfort. Sep 79, 232p MA-SC-700-80020
Prepared in cooperation with United Nations Environment Programme, New York. See also Volume 1, PB80-141500, and Volume 3, PB80-141526.
Also available in set of 3 reports PC E15, PB80-141492.

The report covers a joint IMCO/UNEP study of 73 ports in the Mediterranean Sea to determine the need for reception facilities in these ports for handling oily wastes from ships. The objective of the study was to provide assistance to countries in the Mediterranean Sea to meet the requirements for reception facilities in special areas as prescribed under Regulation 12 of Annex I of the 1973 International Convention for the Prevention of Pollution from ships. This report presents detailed information on ports in Algeria, Cyprus, Egypt, Greece, Israel and Italy.

PB80-141526 PC **A12**/MF **A01**
Inter-Governmental Maritime Consultative Organization, London (England).
Report on Feasibility Study on Reception Facilities for Selected Ports in a Special Area - Mediterranean. Volume III. Reports on the Countries and Ports Visited: Libyan Arab Jamahiriya, Malta, Morocco, Spain, Syrian Arab Republic, Tunisia, Turkey, Yugoslavia,
G. C. Steinman, M. P. Guerin, J. P. Longe, and C. L. Montfort. Sep 79, 254p MA-SC-700-80021
Prepared in cooperation with United Nations Environment Programme, New York. See also Volume 2, PB80-141518.
Also available in set of 3 reports PC E15, PB80-141492.

The report covers a joint IMCO/UNEP study of 73 ports in the Mediterranean Sea to determine the need for reception facilities in these ports for handling oily wastes from ships. The objective of the study was to provide assistance to countries in the Mediterranean Sea to meet the requirements for reception facilities in special areas as prescribed under Regulation 12 of Annex I of the 1973 International Convention for the Prevention of Pollution from ships. This report presents detailed information on ports in Libya, Malta, Morocco, Spain, Syria, Tunisia, Turkey and Yugoslavia.

13L. Safety Engineering

PAT-APPL-6-086 977 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fire Fighting Simulator.
Patent Application,
Edmund Swiatosz. Filed 22 Oct 79, 21p AD-D006 818/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A training device that is a simulator of oil bilge, oil spray, and Class A fires is discussed. The device is fully controllable and imitates the appearance of a machine or engine room. Propane burners are used to provide flames, and flame and water sensors are used to monitor trainee performance. A switch controlled by a dummy valve is also included to be operated by the trainee in its proper sequence of applied procedures. (Author)

PB80-130289 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
New Concepts of Fire Detection.
Final rept.,
K. S. Rajan, Alan Snelson, H. R. Schechter, K. R. Mniszewski, and T. E. Waterman. Dec 78, 100p
Prepared in cooperation with Underwriters' Labs., Inc., Northbrook, IL. Sponsored in part by Grant NSF-C76-19255, National Science Foundation, Washington, DC.

It was recognized early in the program that a major advance in fire detection technology might be affected by combining detectors of differing response characteristics to gain the advantages offered by each. Considering the use of multiple sensors in each detection unit or multiple detector units at given locations is feasible due to recent, significant drops in the market cost of detection devices. The studies contained in the volume are generally exploratory in nature and are reported to provide manufacturers with information to consider in further product development. Topics discussed include the following: Multimode detection; A metal chelation approach; Gold film detectors; Acoustic detection.

PB80-131139 PC **A04**/MF **A01**
IIT Research Inst., Chicago, IL.
Cost/Benefit Analysis of Fire Detectors.
Final rept.,
T. E. Waterman, K. R. Mniszewski, and D. J. Spadoni. Sep 78, 72p
Grant NSF-C76-19255
Sponsored in part by National Fire Prevention and Control Administration, Washington, DC.

The study attempts to determine the economic effectiveness of fire detectors by analyzing data collected from records of fire incidents where fire detectors were employed. Data sources considered were state and local-level fire services, equipment manufacturers, and commercial users of fire protection systems; however, only the Offices of the State Fire Marshals of Michigan and California could supply data for one and two-family dwellings, apartments, and mobile homes with sufficient detail for proper analysis. No fatalities in fire incidents were reported in detector-protected dwellings, and the frequency of reported fires decreased by ten percent. Recommendations made for future data refinement included the use of follow-up forms, insurance company involvement, and improved practices using 901 format. Included are reviews of recent studies of the cost/benefit of fire detectors, a list of references, and a bibliography.

PB80-134463 PC **A10**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
Accident Investigation Studies - Staged Rear Impact Collisions.
Final rept. Jan-Apr 78,
R. Pirtle. Apr 78, 221p 3010-78-47, DOT-HS-805-197
Contract NHTSA-8-0323

The Accident Investigation Division (AID) of the National Center for Statistics and Analysis has been interested for several years in obtaining certain information on various impact modes and vehicle types through staged collisions. The specific data needed has been incomplete or unavailable for the majority of staged collisions. Collisions reported establish data on rear impacts, a mode for which little data is presently available. The information collected includes documentation of trajectory, residual crush, braking and steering forces, and tire marks for each vehicle in each test.

PB80-137888 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Legal Effects of Use of Innovative Equipment at Railroad-Highway Grade Crossings on Railroad's Accident Liability.
Final rept. Apr 78-Apr 79,
David S. Glater, and Terry K. Mond. Dec 79, 52p DOT-TSC-FRA-79-19, FRA-RSS-80-01

The report discusses the effect on a railroad's legal liability for railroad-highway grade crossing accident costs when that railroad uses innovative grade crossing safety equipment. Its purpose is to evaluate the assertion that a railroad's use of innovative warning device technology increases the likelihood that the railroad will be held liable for accidents at that (or other) crossings. The methodology employed in carrying out this research involved the identification and analysis of relevant federal and state court decisions. Three significant conclusions resulted from this study. First, railroads do not necessarily increase their legal liability for grade crossing accident costs by deploying innovative grade crossing warning equipment. Second, railroads should carefully monitor government and industry activities demonstrating the feasiblity of new warning equipment because such activities may affect their liability exposure. Finally, railroads may deploy new technology at a particular rail-highway crossing in response to accidents at that site without significant adverse effect on their position in relevant litigation.

PB80-138118 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report - Sinking of the M/B SIDS in the Atlantic Ocean Near Absecon Inlet, Atlantic City, New Jersey, January 18, 1978.
3 Jan 80, 27p NTSB-MAR-80-2

About 0428 e.s.t. on January 18, 1978, the M/B SIDS sank in the Atlantic Ocean about 2 nmi offshore from Absecon Inlet, Atlantic City, New Jersey. The SIDS' steering system had failed, and the vessel was being towed to the Atlantic City harbor by a Coast Guard 41-ft utility boat. When a large wave broke over the utility boat's starboard side, the utility boat rolled about 45 deg. to port and the crewmen were thrown to the deck. When the crewmen recovered, the SIDS was no longer in sight and the towline was slack. Both persons on board the SIDS died. The SIDS washed up on the Atlantic City beach several hours later. The Nation-

al Transportation Safety Board determines that the probable cause of the accident was the capsizing of the M/B SIDS because of the severe flooding and overturning moment caused by a large wave which broke over the vessel's starboard side. Contributing to the accident were a steering system failure of undetermined cause and the crew's decision to depart Atlantic City during adverse weather.

PB80-141435 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Report - Multiple Vehicle Median Barrier Crossover and Collision, Grand Central Parkway, New York, New York, June 8, 1979.
21 Nov 79, 24p NTSB-HAR-79-8

About 11:05 p.m., June 8, 1979, a Buick sedan, with eight occupants, was westbound on the Grand Central Parkway in New York City. The Buick, while in the acceleration lane of the 188th Street westbound, parkway entrance ramp, passed another westbound vehicle at a high rate of speed. Upon re-entering the parkway through lanes, the Buick veered out of control to the left, vaulted the median guardrail, and collided with three eastbound passenger cars. Two passengers in the Buick and the drivers of two of the eastbound cars were killed; 10 persons were injured. The National Transportation Safety Board determines that the probable cause of this accident was the Buick driver's loss of vehicle control which resulted from driver intoxication, excessive speed, and sharp steering maneuvers while passing another westbound vehicle. Contributing to the severity of the accident was the failure of the substandard median barrier system to contain the Buick which vaulted into the opposing lanes of traffic.

PB80-141740 PC **A03**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Assessment of Risks and Risk Control Options Associated with Liquefied Natural Gas Trucking Operations from Distrigas Terminal, Everett, Massachusetts. Executive Summary.
Final rept.
Jun 79, 30p ADL-82280, DOT/RSPA/MTB-79/12
Contract DOT-RC-82037
See also Volume 1, PB80-141757.

The study evaluates the current and future levels of risk associated with LNG trucking operations from the Everett facility and compare these risks with estimated risks associated with other activities and with alternative transportation modes. In addition, the effects of possible risk control options were also evaluated in terms of route changes; timing modification; and other alternatives. The Everett LNG facility was selected as the focal point of the study because it perhaps best represents the combination of safety issues involved in the transportation of LNG. The facility is a major import terminal; it is also a distribution point which supplies LNG to numerous peak-shaving and satellite facilities in the Northeastern United States by tank truck. The Distrigas facility is also a facility located in a densely populated area of the United States, and its supply routes are also characterized high population densities. An overriding objective of the study is to provide technical information for the quantification of the risks associated with the transportation of LNG by various routes and by various modes.

PB80-141757 PC **A10**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Assessment of Risks and Risk Control Options Associated with Liquefied Natural Gas Trucking Operations from Distrigas Terminal, Everett, Massachusetts. Volume I.
Final rept.
Jun 79, 218p ADL-82280, DOT/RSPA/MTB-79/9
Contract DOT-RC-82037
See also PB80-141740.

The trucking of LNG is primarily associated with distributing LNG to peak storage tanks and satellite facilities for use as a supplement to pipeline natural gas supplies. Various public and private organizations are concerned with the need to evaluate the current and future risks associated with LNG trucking, the risks associated with potential modal alternatives to LNG truck transportation (e.g., barge and rail tank car) and with risk mitigation measures. The focus of the study is an LNG trucking operations originating at the Distrigas LNG facility in Everett, Massachusetts. All important operational parameters necessary for the quantification of overall trucking risks were identified (e.g., number of the truck shipments, their destinations, population density along route, traffic density, etc.). Accidents and spill rate probabilities were estimated on the basis of historical data. Mathematical models to predict the hazard represented by liquid pool fires, vapor cloud fires, and other effects were combined with criteria to estimate damage consequences. Risk profiles were developed to depict the probability and number of fatalities and injuries associated with current planned, and maximum levels of LNG trucking activities. Changes in key operational parameters were evaluated to determine how they might effect the risk, in terms of route characteristics, day versus night travel, improved driver education and enhanced emergency response capabilities.

13M. Structural Engineering

AD-A079 862/9 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Column Buckling of Isotropic and Composite Beams Using a Truncated Fourier Series.
Master's thesis,
John Louis Insprucker, III. Dec 79, 139p Rept no. AFIT/GA/AA/80M-2

A trigonometric approach to finite difference calculus was applied to solve for beam buckling loads using a virtual work method. The trigonometric equation, a truncated Fourier series, permitted varying the buckling load by adjusting a wavelength parameter. Values for the buckling load of a variety of beams - uniform, homogeneous, variable and discontinuous inertias, composite - were found under a wide range of boundary conditions. An optimization scheme was used which determines the critical load by locating the intersection of two buckling load curves. The method is accurate as long as points of interest - maximum inertia, discontinuities - are modeled by the nodal arrangement. The trigonometric approach provided improved accuracy over the conventional approach for a wide range of wavelengths. For an infinite value of the wavelength, the trigonometric approach converges to the conventional one. A variable mesh designed to concentrate nodes about points of interest was found to be relatively ineffective when compared to a uniform mesh. Composite materials were modeled using an equivalent flexural rigidity.

ESDU-INDEX-79-80 PC**$10.00**
Engineering Sciences Data Unit Ltd., London (England).
Engineering Sciences Data Unit Index, 1979-80.
c1979, 440p
Supersedes ESDU-INDEX-77-78.

Contents:
Introduction and guide to use;
Current constitution of technical committees;
Complete sub-series and section list;
Index;
Table I - physical properties of pure compounds;
Table II - physical properties of elements;
Table III - IDS(B):
thermodynamic properties of aqueous organic systems.

PB80-134810 PC **A14**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Statistical Analysis of the Response of Nonlinear Systems Subjected to Earthquakes.
Civil engineering studies,
Rafael Riddell, and Nathan M. Newmark. Aug 79, 312p STRUCTURAL RESEARCH SER-468, UILU-ENG-79-2016, NSF/RA-790273
Grants NSF-AEN75-08456, NSF-ENV77-07190

The dynamic response of single degree of freedom nonlinear systems subjected to earthquake motions is considered with the purpose of deriving factors for constructing inelastic design spectra, and of evaluating the effect of damping combined with inelastic behavior and the influence of the type of material nonlinearity on inelastic response. Inelastic response spectra for elastoplastic systems with 2, 5, and 10 percent damping, and for bilinear and stiffness degrading systems with 5% damping, are computed for a number of frequencies ranging from about 0.03 cps to 35 cps, for ductility values from 1 to 10, and for ten strong motion earthquake records. A statistical procedure is developed to analyze the data. From this analysis, factors for deriving the characteristic trapezoidal design spectrum are obtained.

PB80-135569 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Optimum Seismic Protection for New Building Construction in Eastern Metropolitan Area. Evaluation of Expected Losses and Total Present Cost: Preliminary Sensitivity Analysis, Internal Study Report Number 10,
Erik H. Vanmarcke, John W. Reed, and Dennis A. Roth. Jul 72, 40p NSF-RA-E-72-301
Grant NSF-GK-27955
See also PB80-108178.

A computer program to evaluate expected future losses due to earthquakes and to determine the best strategy for earthquake protection of buildings based on a minimum expected cost criterion is presented. The program can be used for analyzing the seismic performance of a particular building or of a mix of buildings of different types. The input information required is identified, and the principal computations carried out by the program are summarized. Details of the input data format are presented and a typical program printout is shown. The results of a preliminary sensitivity analysis, in which the effects of the following input parameters were investigated, are examined: the earthquake occurrence probabilities; the damage state cost ratios; the initial cost penalties; and the discount rate. The sensitivity with respect to the choice of damage probabilities, can be assessed indirectly by comparing the expected future losses associated with the various design strategies. The damage probabilities for modern tall buildings for the five design strategies considered are given. The damage state categories are listed in terms of the direct cost of repairs and in terms of associated non-physical costs.

PB80-136856 MF **A01**
Simpson Gumpertz and Heger, Inc., Cambridge, MA.
Structural Plastics Design Manual. Phase I. Chapters 1-4.
Frank J. Heger, Richard Chambers, and Albert G. H. Dietz. Jul 78, 505p HUD-0000810, HUD/PDR-361
Paper copy available from the Sup. of Docs., Stock number 023-000-00495-0

This design manual is intended to assist the practicing engineer in the evaluation and use of plastics as structural materials. Consequently, it emphasizes those technological aspects of the broad class of materials which affect structural behavior and outlines the various categories of plain and modified plastics, noting their basic behavior under the conditions of stress, strain, time, and temperature that control design. It reviews fabrication processes and their effects on materials usage and characteristics, and considers influences of the environment that result in degradation of structural properties. Above all, it examines the design principles and practices applicable to plastics and composites when employed structurally. Divided into four chapters, the manual covers these topics: (1) introduction to structural plastics material and composites, (2) behavior of structural plastics, (3) materials criteria for structural design, and (4) overall considerations in structural design with plastics. It is noted that development of successful plastics structures involves careful analysis of functional requirements and cost targets followed by consideration of all of the factors which affect the use of structural plastics: advantages of both structural and nonstructural qualities and characteristics, formability and structural configuration, combination with other parts of a system and efficiency of support arrangements, economics of processing design for efficient molding, accurate materials strength and stiffness characterization, determinations of stress and strain by an analysis

which is appropriate for both structure and application, and final evaluation of structural adequacy by prototype test followed by monitoring and analysis of service performance. References and illustrations are provided.

PB80-137052 MF **A01**
Portland Cement Association, Skokie, IL.
Seismic Tests of Horizontal Joints. Supplemental Report C. Design and Construction of Large-Panel Concrete Structures.
H.G. Russell, and W.G. Corley. Jan 79, 49p
HUD-0000924, HUD/PDR-107/7
Contract HUD-H-2131R
Paper copy available from the Sup. of Docs., Stock number 023-000-00551-6.

Preliminary tests to investigate the force versus deformation characteristics of a horizontal joint in a large - panel (LP) building subjected to simulated seismic loading are described. The report is the third of three supplemental reports leading to the development of a methodology for the design and construction of LP structures. Its objective is to present factual data and conclusions relating to the resistance of LP structures to earthquake loadings. Five full - scale joints were tested under simulated seismic movements that caused the joint to slide in the plane of the wall. To determine the coefficient of friction for extremely smooth joint surfaces with different magnitudes of vertical loads on the wall, testers placed vertical ties in the two test specimens. Test results indicated a variation in the coefficient of friction from a minimum of 0.2 to a maximum of 0.4 for the smooth surfaces used on the wall ends at the joint. The minimum value was associated with joints undamaged by repeated sliding up to a displacement of 0.6 (15 millimeters). A rectangular, stable shear - displacement loop was obtained when no tie was used in the joint. Localized concentration of shear resistance at a vertical tie through the joint caused severe damage to the grouted joint portion between the slab ends. Cracking and crushing of the grout disturbed shear transfer. Padding on a vertical tie reduced the damage to minor local crushing of grout at the tie edge. A tie in the joint produced a shear - displacement loop that was shaped like a parallelogram. These test data can be used in the dynamic seismic analysis of LP structures. References, diagrams, and photographs of study objects are provided. (Author abstract modified).

PB80-137128 MF **A01**
Portland Cement Association, Skokie, IL.
Wall Cantilever and Slab Suspension Tests. Supplemental Report A. Design and Construction of Large-Panel Concrete Structures.
E.G. Russell, and W.G. Corley. Nov 78, 126p
HUD-0000972, HUD/PDR-107/5
Contract HUD-H-2131R
Paper copy available from the Sup. of Docs., Stock number 023-000-00302-3.

As part of a study on the design and construction of large - panel (LP) concrete structures, this supplemental report describes the cantilever action and slab suspension tests which were conducted to investigate alternative load paths in LP strucutres and the stability of panels in the event of partial loss of a supporting wall. In the cantilever tests, panels above the ineffective panel acted as cantilevers from the adjacent undamaged structure. Cantilever action was examined with three - eighths scale models of multistory walls of selected buildings. One exterior wall specimen was built and tested in sequence to a six - story height with five cantilever stories above a missing wall panel. Vertical load was applied to the cantilever half of the wall to represent dead load and expected live load. Measurements were made to determine tension force in the horizontal transverse tie at each floor level. Another specimen was made with three stories to investigate exterior walls with a lesser amount of transverse tie steel, while another two were used to evaluate interior walls. The results show that development of cantilever resisting movement depends on a tension force in floor - level connecting ties and a compressive stress block at the lowest level. Slab suspension tests used to develop suitable tie details in the floor system for ensuring continuity involved full - scale test models and pullout tests for 54 specimens. Although full suspension was not achieved, the investigation indicated the maximum embedment lengths necessary to avoid strand fracture and revealed that maintenance of continuity in the slab system in the deformed state is of prime importance to reduce debris loading. Illustrations, photographs, and graphs support study data. References are provided. (Author abstract modified).

PB80-137136 MF **A01**
Portland Cement Association, Skokie, IL.
Horizontal Joint Tests. Supplement Report B. Design and Construction of Large-Panel Concrete Structures.
H.G. Russell, and W.G. Corley. Nov 78, 76p
HUD-0000973, HUD/PDR-107/6
Contract HUD-H-2131R
Paper copy available from the Sup. of Docs., Stock number 023-000-00371-6.

Full - scale tests conducted on horizontal joints to investigate the behavior of wall - to - floor connections are described in this research report, one of three studies on the integrity of large - panel concrete structures. Sixteen full - scale joint tests involved specimens consisting of an assembly of precast hollow - core floor slabs and precast concrete wall elements forming a wall - to - floor connection. The specimens represented a short length of wall from a large - panel building. Grout was used to fill the joint between the ends of the floor slabs. Transmission of vertical load through the joint was examined by applying vertical compressive force in increments. The seven splitting tests were made on specimens consisting of a short wall element loaded to represent partial surface loading present in the joint. Controlled test variables were strength of grout, amount of transverse wall reinforcement, filled or unfilled slab cores, and applied floor moment and rotation. Compressive strength of concrete and precast hollow - core slab elements were kept constant. Patterns of grout crushing, wall splitting, and slab crushing were identified. The tests indicated that joint capacity increases with grout compressive strength, wall splitting does not occur when low - strength grout is used, filling slab cores with grout directly affects joint strength, inadequate dry packing below the upper wall panel leads to loss of joint strength, and floor moment and rotation do not affect joint capacity. Various design methods for determining load capacity of horizontal joints are discussed, comparisons of measured and calculated strength for various joints are made, and details of the experimental program and properties of grouts used are provided, as are detailed recommendations for specific analysis and design of connections. Illustrations and photographs support the study; references are included.

PB80-137318 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Optimum Seismic Protection for New Building Construction in Eastern Metropolitan Areas. Inventory of Buildings for Boston and Cambridge, Internal Study Report Number 6,
John E. Brennan, and Robert J. McNamara. Apr 72, 11p NSF-RA-E-72-280
Grant NSF-GK-27955

A seismic protection survey of existing buildings in Boston and Cambridge was conducted to provide a data base for the Boston area. The data base was constructed from information supplied by the Sanbord Map Co., and supplemented by that furnished by the U.S. Corps of Engineers. Building data for each structure five stories and higher included in the survey was recorded on a detailed seismic protection study form. Following a review of the compiled data, categories were finalized to provide information as follows on each building: address, number of stories and basements, year constructed, floor, exterior, foundation and frame construction, and soil conditions. Data on punch cards can be displayed using listed key codes. A sample page of a report generated by sorting out the number of stories, the lateral force system, and the frame type and construction is included, together with a list of pertinent internal study reports.

PB80-138985 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Procedures for SDDA Boston Building Inventory. Seismic Design Decision Analysis, Internal Study Report No. 66,
Jon Ochshorn, and Betsy Schumacker. Aug 76, 22p NSF/RA-761813
Grant NSF-GI-27955
Also pub. as Seismic Design Decision Analysis-66.

Methods of obtaining building information and categorizing it with respect to seismic response for a ten-mile square area in Boston are described. A knowledge of the distribution of various types of buildings in an area is essential for estimating the consequences of a hypothetical earthquake. Problems involved in estimating the distribution of buildings generally are of two types: defining building types and associated probable consequences at various levels of shaking, and obtaining an inventory of the various building types. The first problem essentially entails reaching a compromise between the multiplicity of actual building types and the computational necessity of working with a limited number of types. The second problem is that of estimating numbers of buildings without actually counting them individually. Information was obtained from the city's assessing departments, building departments, the Sanborn Map Company, Bureau of Census tables on residential structures, aerial photography, Civil Defense data, maps and other sources. The appendix details the information obtained from these various sources.

PB80-140395 PC **A07**/MF **A01**
Texas Univ. at Austin. Structures Research Lab.
Shear Behavior of Reinforced Concrete Members Under Bidirectional Reversed Lateral Loading,
K. Maruyama, and J. O. Jirsa. Aug 79, 133p
CESRL-79-1, NSF/RA-790270
Grant NSF-ENV77-20816

The influence of lateral load or deformation history on shear behavior was examined. Ten specimens were subjected to different loading histories. The dimensions and reinforcement of all test specimens were identical. Each load path or load sequence was imposed on the specimens using a specially fabricated servo-controlled loading system which applied lateral translations perpendicular to the longitudinal axis of the specimen. Rotation of the ends of the specimens was controlled to simulate a column between stiff floors. The influence on load and deformation history was examined by comparing performance in terms of shear strength deterioration, stiffness reduction, strain distribution in transverse reinforcement, and crack patterns. Based on test results, a conceptual model was developed for analyzing the shear behavior of members under multi-directional loading. The model was based on the concept of a damage index which was developed to help describe the shear failure mechanism. A sand-spring analogy was introduced as one component of the model. Details of the analytical procedure were based on measured response of the members. The model was used to estimate the shear response under various deformation histories and it is limited to members which have geometry similar to that of the members tested.

PB80-141088 Not available NTIS
National Bureau of Standards, Washington, DC.
Life-Cycle Costing Translating Cost-Saving Potential into Real Dollars in the Area of Building Energy Management.
Final rept.,
R. T. Ruegg. Mar 79, 5p
Pub. in Building. Oper. Manage., v26 n3 p52-56, Mar 79.

This article provides an overview of life-cycle costing as an aide to making energy conservation investment decisions in buildings. It reports briefly on the current status of the life-cycle costing approach in government and business as applied to energy conservation, reviews essential features of the method, and explains how it can be used to solve five common investment problems. It is aimed at operators, owners, and managers of commercial, industrial, institutional, and educational buildings.

PB80-142250 PC **A13**/MF **A01**
Universities Council for Earthquake Engineering Research, Pasadena, CA.
Proceedings of the National Meeting of the Universities Council for Earthquake Engineering Research (5th) Held at Massachusetts Inst. of Tech., Cambridge on June 23-24, 1978.
Jun 78, 291p UCEER-5, NSF/RA-780693

Grants NSF-ENV77-22524, NSF-ENV76-20744

The purpose of this meeting was to provide a vehicle for the exchange of information related to current and projected university research in earthquake engineering and to evaluate progress in specific areas of research and establish goals and priorities for future work. Ninety-five individuals gave reports. The written summaries of these reports as well as some summaries not presented orally are contained in this report. The summaries are organized under the following topics: ground motion; soils and soil structure interaction; structural elements; structural response, experimental; structural response, analytical; seismic risk, seismic design and codes.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A079 565/8 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Acoustic Water Leak Analyzer. Operator's Manual,
P. M. Moore, R. C. Tate, and J. W. Dickey. Jan 80, 50p Rept no. DTNSRDC/PAS-79/44

This manual describes the operation and maintenance of the Acoustic Water Leak Analyzer. Principles of operation, controls, setup, operation, and troubleshooting are described. (Author)

AD-A079 811/6 PC **A02**/MF **A01**
Sri International Arlington VA
Impact Fusion with A Segmented Rail Gun.
Technical note,
R. A. Muller, R. L. Garwin, and B. Ricther. Dec 79, 16p Rept no. SRI-JSN-79-05
Grant EY-76-C-0115

The rail gun offers an attractive alternative to the traveling wave rifle for the magnetic acceleration of macroscopic (0.05 g) bullets for impact fusion. In this paper we review the basic rail gun equations and indicate how energy efficiency can be designed in. We set as our preliminary goal the delivery of 1 megajoule in 10 nanoseconds, with a specific energy of 20 MJ/g (i.e. a bullet mass of 0.05 g); these values are taken from the requirements being considered for heavy-ion fusion. Using these numbers the final particle velocity is 200 km/sec. For a delivery time of 10 nanoseconds, this velocity implies that the projectile length is about 2 mm. Impact fusion is feasible because of the coincidence that a bullet with all dimensions roughly 2 mm has the required mass. (Author)

AD-A079 951/0 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Multiple Platform Sensor Integration Model: MULSIM Computer Program.
Interim rept.,
A. Grindlay. 31 Dec 79, 106p NRL-8358, AD-E000 349

The Multiple Platform Sensor Integration Model (MULSIM) simulates the operation of a track management system that is receiving inputs from a large number of widely distributed platform/sensors. The model consists of two basic parts: a stimulator and a track correlation/association module. The stimulator produces noisy detections from an input scenario. The detections from each platform are subjected to a correlation/association process and the detections which associate with existing tracks are integrated with selected detections from other platforms to produce updated position estimates of system tracks.

AD-A080 002/9 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Ammeter, AC, Clamp-on,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 15p Rept no. 1574-01-1-2077
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines an Ammeter, AC, Clamp-On, herein-after called the equipment. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R, per MIL-T-28800.

AD-A080 003/7 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Generator, Signal Function,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2079
Contract DAAB07-78-A-6606

This specification is approved for use by te Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. The requirements for the equipment are classified as follows: Safety, Parts(materials and processes), Design and construction, Electrical power sources and connections, Dimensions and weight, Enclosure requirements, Marking and identification, Environmental requirements, Reliability requirements, Performance characteristics.

AD-A080 004/5 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Multimeter, Digital,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 18p Rept no. 1574-01-1-2080
Contract DAAB07-78-A-6606

This specification defines a Digital, Multimeter. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 005/2 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Multimeter, Digital Handheld,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 17p Rept no. 1574-01-1-2081
Contract DAAB07-78-A-6606

This specification defines a Multimeter, Digital, Handheld, hereinafter called the equipment. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and, as herein stated, with the convertible/rack-mountable capability.

AD-A080 006/0 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Power Meter, RF in-Line,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2082
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Power Meter, RF In-Line, hereinafter called the equipment. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and, as herein stated, with the convertible/rack-mountable capability.

AD-A080 007/8 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Power Meter, SHF,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 17p Rept no. 1574-01-1-2083
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. (Author)

AD-A080 008/6 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Spectrum Analyzer, Low Frequency,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 17p Rept no. 1574-01-1-2084
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. (Author)

AD-A080 009/4 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Spectrum Analyzer, RF,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2085
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. (Author)

AD-A080 011/0 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Transmission Test Set,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2087
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Transmission Test Set. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 012/8 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Voltmeter, AC True RMS,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2088
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Voltmeter, AC True RMS. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 013/6 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Voltmeter, RF,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2089
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Voltmeter, RF. The equipment defined by this specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 014/4 PC **A02**/MF **A01**
Arinc Research Corp Annapolis MD
Military (OTS ETE) Specification for the Wattmeter, RF,
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 15p Rept no. 1574-01-1-2090
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Wattmeter, RF. The equipment defined by this

specification shall be Type II, Class 5, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 075/5 PC **A02**/MF **A01**
ARINC Research Corp Annapolis MD
Military (OTS ETE) Specification for the Cable Test Set, Time Domain Reflectometer (TDR),
Benjamin F. Paiz, and Albert L. Simmons. Dec 79, 16p Rept no. 1574-01-1-2078
Contract DAAB07-78-A-6606

This specification is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense. This specification defines a Cable Test Set, Time Domain Reflectometer (TDR). The equipment defined by this specification shall be Type II, Class 3, Style E, Color R per MIL-T-28800 and with the convertible/rack-mountable capability.

AD-A080 092/0 PC **A04**/MF **A01**
Southwest Research Inst San Antonio TX
Research and Development of NMR Methods for the Nondestructive Characterization of Internal Stress and Strain in Nonferromagnetic Structural Materials.
Final technical rept. 1 Jun 76-31 Oct 79,
G. A. Matzkanin. 31 Dec 79, 64p AFOSR-TR-80-0106
Contract F44620-76-C-0114

Two new nondestructive evaluation (NDE) methods for measuring residual stress in non-ferromagnetic metals have been investigated, namely, inductive nuclear magnetic resonance (NMR) and nuclear acoustic resonance (NAR). In metals, NMR is restricted to the surface by the electromagnetic skin effect while NAR is sensitive to the interior of the specimen as well as the surface. Results of NAR experiments on plastically deformed polycrystalline aluminum specimens were very encouraging. The NAR signature was found to vary with degree of plastic deformation in agreement with published NMR theory based on strain-induced quadrupole interactions. Shapes of the NAR signals from deformed aluminum were found to depend on the magnetic modulation frequency; it is suggested that this modulation dependence could form the basis for determining distributions of internal stress and strain in metals. Pulsed NMR experiments on bulk aluminum specimens were complicated by large electromagnetically generated acoustic transient signals not associated with nuclear resonance. Digital subtraction signal processing was used to discriminate against the spurious signals; however it did not separate NMR signals from the electromagnetically generated transients. Pulsed NMR signals observed from aluminum in a powdered specimen of the superalloy IN-100 provides a basis for considering NMR and NAR for nondestructive measurements in this important class of alloys. (Author)

AD-B008 985/4 PC **A08**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station Tenn
Calibration of the AEDC-PWT 16-ft Transonic Tunnel at Test Section Wall Porosities of Two, Four, and Six Percent.
Final rept. Oct 72-Jun 73,
F. M. Jackson. Jan 76, 169p Rept no. AEDC-TR-76-13
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn., Rept. no. ARO-PWT-TR-75-97.
Distribution limitation now removed.

Tests were conducted in the AEDC Propulsion Wind Tunnel (16T) to determine the centerline Mach number distributions and the tunnel calibration at test section wall porosities of two, four, and six percent. The calibration was conducted over the Mach number range from 0.2 to 1.6. A quantitative evaluation of the effects of Mach number, tunnel pressure ratio, test section wall angle, and test section wall porosity upon the centerline Mach number distributions was determined by analysis of the local Mach number deviations. Limited data were also obtained to provide an indication of the effect of Reynolds number upon the calibration. The results indicate that Mach number distributions of good flow quality are obtained at porosities of two, four, and six percent for test section wall angles which vary from 0 to 0.50 deg. Variation of test section wall porosity, as well as wall angle, significantly affects the Tunnel 16T calibration. Comparison of this calibration with a previous calibration, however, indicates that no new tunnel calibration is required for operation at a porosity of six percent with either a zero or optimum wall angle schedule. (Author)

N80-16068/2 PC **A03**/MF **A01**
Washington Univ., Seattle.
Recent Research on V/STOL Test Limits at the University of Washington Aeronautical Laboratory.
Final Report.
S. Shindo, and W. H. Rae, Jr.. Feb 80, 27p NASA-CR-3237
Contract NGL-48-002-035

The occurence of flow breakdown during the wind tunnel testing of a powered V/STOL aircraft was studied. Flow breakdown is the low forward speed test limit in a solid wall wind tunnel and is characterized by a vortex which forms on the floor and walls of the wind tunnel thereby failing to simulate free air conditions. The flow is caused by the interaction of the model wake and tunnel boundary layer and affects the model's aerodynamic characteristics in such fashion as to negate their reliability as correctable wind tunnel data. The low speed test limit was examined using a model that possessed a discretely concentrated powered lift system using a pair of lift jets. The system design is discussed and the tests and results which show that flow breakdown occurs at a velocity ratio of approximately 0.20 are reported.

N80-16070/8 PC **A07**/MF **A01**
Franklin Inst. Research Labs., Philadelphia, PA.
Feasibility and Concept Study to Convert the NASA/Ames Vertical Motion Simulator to a Helicopter Simulator.
Final Report.
C. A. Belsterling, R. C. Chou, E. G. Davies, and K. C. Tsui. Sep 78, 150p NASA-CR-152193
Contract NAS2-9884, NASA ORDER C-4952-1

The conceptual design for converting the vertical motion simulatior (VMS) to a multi-purpose aircraft and helicopter simulator is presented. A unique, high performance four degrees of freedom (DOF) motion system was developed to permanently replace the present six DOF synergistic system. The new four DOF system has the following outstanding features: (1) will integrate with the two large VMS translational modes and their associated subsystems; (2) can be converted from helicopter to fixed-wing aircraft simulation through software changes only; (3) interfaces with an advanced cab/visual display system of large dimensions; (4) makes maximum use of proven techniques, convenient materials and off-the-shelf components; (5) will operate within the existing building envelope without modifications; (6) can be built within the specified weight limit and avoid compromising VMS performance; (7) provides maximum performance with a minimum of power consumption; (8) simple design minimizes coupling between motions and maximizes reliability; and (9) can be built within existing budgetary figures.

N80-16402/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Spectral Filter for ESMR's Sidelobe Errors.
D. Chesters. Sep 79, 26p NASA-TM-80555

Fourier analysis was used to remove periodic errors from a series of NIMBUS-5 electronically scanned microwave radiometer brightness temperatures. The observations were all taken from the midnight orbits over fixed sites in the Australian grasslands. The angular dependence of the data indicates calibration errors consisted of broad sidelobes and some miscalibration as a function of beam position. Even though an angular recalibration curve cannot be derived from the available data, the systematic errors can be removed with a spectral filter. The 7 day cycle in the drift of the orbit of NIMBUS-5, coupled to the look-angle biases, produces an error pattern with peaks in its power spectrum at the weekly harmonics. About plus or minus 4 K of error is removed by simply blocking the variations near two- and three-cycles-per-week.

N80-16650/7 PC **A11**/MF **A01**
Earthquake Engineering Systems, Inc., San Francisco, CA.
Potential Utilization of the NASA/George C. Marshall Space Flight Center in Earthquake Engineering Research.
R. E. Scholl. Dec 79, 234p NASA-CR-161371
Contract NAS8-33220
Subm-Sponsored in Part by NSF.

Earthquake engineering research capabilities of the National Aeronautics and Space Administration (NASA) facilities at George C. Marshall Space Flight Center (MSFC), Alabama, were evaluated. The results indicate that the NASA/MSFC facilities and supporting capabilities offer unique opportunities for conducting earthquake engineering research. Specific features that are particularly attractive for large scale static and dynamic testing of natural and man-made structures include the following: large physical dimensions of buildings and test bays; high loading capacity; wide range and large number of test equipment and instrumentation devices; multichannel data acquisition and processing systems; technical expertise for conducting large-scale static and dynamic testing; sophisticated techniques for systems dynamics analysis, simulation, and control; and capability for managing large-size and technologically complex programs. Potential uses of the facilities for near and long term test programs to supplement current earthquake research activities are suggested.

N80-16838/8 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Stress Wave Attenuation in Thin Structures by Ultrasonic Through-Transmission.
Final Report.
S. S. Lee, and J. H. Williams, Jr. Jan 80, 32p NASA-CR-3203
Grant NSG-3210

The steady state amplitude of the output of an ultrasonic through transmission measurement is analyzed and the result is given in closed form. Provided that the product of the input and output transduction ratios; the specimen-transducer reflection coefficient; the specimen-transducer phase shift parameter; and the material phase velocity are known, this analysis gives a means for determining the through-thickness attenuation of an individual thin sample. Multiple stress wave reflections are taken into account and so signal echoes do not represent a difficulty. An example is presented for a graphite fiber epoxy composite (Hercules AS/3501-6). A direct method for continuous or intermittent monitoring of through thickness attenuation of plate structures which may be subject to service structural degradation is provided.

PATENT-3 753 086 Not available NTIS
Department of the Navy Washington DC
Method and Apparatus for Locating and Measuring Wave Guide Discontinuities.
Patent,
William B. Shoemaker, Jr. Filed 9 Dec 70, patented 14 Aug 73, 8p AD-D006 854/4, PAT-APPL-096 512
Supersedes PAT-APPL-096 512-70.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An intermittent pulsed carrier signal having a frequency of approximately 10 gigahertz and on for approximately 10 nanoseconds duration is transmitted through a wave guide. Wave guide discontinuities reflect a portion of the incident pulse, and these reflected signals are detected and compared to the incident pulse relative to time and amplitude differences. The discontinuity point in the wave guide is then directly determined using time domain reflectometry, from the time interval for the signal to reach the discontinuity and for the reflected wave to travel back along the wave guide and be detected. As the intensity of the reflected signal is functionally related to the magnitude of the fault, a display of the reflected signal magnitude, compared to the incident signal magnitude, will indicate the magnitude of the wave guide discontinuity. (Author)

PATENT-4 095 106
Not available NTIS
Department of Energy, Washington, DC.

Radiation Attenuation Gauge with Magnetically Coupled Source.
Patent,
S. A. Wallace. Filed 16 Mar 77, patented 13 Jun 78, 8p PAT-APPL-778 196
Supersedes PAT-APPL-778 196-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is a radiation attenuation gauge for measuring thickness and density of a material which includes, in combination, a source of gamma radiation contained within a housing of magnetic or ferromagnetic material, and a means for measuring the intensity of gamma radiation. The measuring means has an aperture and magnetic means disposed adjacent to the aperture for attracting and holding the housed source in position before the aperture. The material to be measured is placed between the source and the measuring means. (ERA citation 05:010487)

PATENT-4 171 526
Not available NTIS
Department of the Navy Washington DC
Event Mark Decoder for Use with Time Code Generator.
Patent,
Peter W. Bauer. Filed 2 Oct 78, patented 16 Oct 79, 4p AD-D006 866/8, PAT-APPL-947 982
Supersedes PAT-APPL-947 982-78, AD-D005 519.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A logic circuit for decoding parallel BCD output from a time code generator to operate an analog event marker pen on a strip chart recorder, every one minute a one second pulse, every ten minutes a ten second pulse, and every hour a sixty-one second pulse output is generated. (Author)

PATENT-4 173 000
Not available NTIS
Department of the Navy Washington DC
Simulated VLF/LF Noise Generator.
Patent,
Paul A. Singer, and Roger K. Cernius. Filed 21 Aug 78, patented 30 Oct 79, 7p AD-D006 867/6, PAT-APPL-935 200
Supersedes PAT-APPL-935 200-78, AD-D005 330.
Availability: This Government-owned invention available for U.S. licensing, and possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a reliable, repeatable and stable generator capable of producing noise with known or given amplitude probability distributions up to 96 dB dynamic range, commonly found in atmospheric noise VLF/LF frequency bands. A continuous impulse noise amplitude probability distribution is digitally synthesized in a piece-wise fashion in 6 dB amplitude increments. These increments are linearly combined with a digitally generated Gaussian noise component for simulation of VLF and LF atmospheric noise. (Author)

PATENT-4 179 604
Not available NTIS
Department of the Navy Washington DC
Electron Collector for Forming Low-Loss Electron Images.
Patent,
Aristos Christou. Filed 29 Sep 78, patented 18 Dec 79, 8p AD-D006 879/1, PAT-APPL-946 986
Supersedes PAT-APPL-946 986-78, AD-D005 467.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a scanning electron beam system wherein a primary beam of electrons is scanned over the surface of a specimen and electron images are generated by collecting electrons scattered from the surface, and improved electron collector for selectively collecting the primary electrons that have suffered low loss in being scattered by the surface. Three symmetrically shaped mesh grids are arranged in front of a scintillator in the path of the backscattered electrons. The grids are disposed relative to each other and biased so that the electric fields permit passage of electrons with a narrow energy range. The scintillator is coated with a layer of tantalum and a layer of gold to provide thermal stability and resistance to damage from bombardment by high-energy electrons. (Author)

PATENT-4 182 678
Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Micro-Scale Countercurrent Chromatograph.
Patent,
Yoichiro Ito. Filed 14 Dec 78, patented 8 Jan 80, 9p PB80-141054, PAT-APPL-969 570
Supersedes PB-297 173.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to centrifugal liquid processing apparatus, and more particularly to a coil planet centrifuge apparatus of the flow-through vertical-axis type employing a helically-coiled countercurrent separation column.

PB80-127962 Not available NTIS
National Bureau of Standards, Washington, DC.
Thoughts on the Stability of Strain Gages and Strain Gage Based Transducers Under Load.
Final rept.,
R. L. Bloss. 1976, 3p
Pub. in Proceedings of the Technical Committee on Strain Gages in Field Test Environments Held at Silver Spring, MD., on May 10, 1976, p16-18 1976.

Although information exists on the change of strain gage and transducer response with time during storage and when occasional load cycles are imposed, there is almost no published information on the changes that occur when loads are sustained for long periods of time (week to years). This paper speculates on factors that could cause various changes and suggests that an effort should be made to evaluate some of these factors.

PB80-128978 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
A Battery-Operated Air Sampler for Remote Areas.
Final rept.,
K. W. Brown, G. B. Wiersma, and C. W. Frank. Nov 79, 16p EPA/600/4-79/071

An air sampling system developed to evaluate air quality in biosphere reserves or in other remote areas is described. The equipment consists of a Dupont P-4000 pump and a specially designed battery pack containing Gates batteries. This air sampling system was tested in Southern Utah and at 10 remote sampling sites in the Great Smoky Mountains National Park. The equipment was backpacked to the remote sampling sites, and was operated continuously at full capacity for a maximum 8-day period. Except for tampering by curious hikers at one site, the equipment operated satisfactorily.

PB80-130701 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Dimensions/NBS. Volume 63, Number 12, December 1979.
Monthly rept.
Dec 79, 37p NBS/DIM-63/12
See also Volume 63, Number 6 dated Jun 79, PB-297 836.

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: Protecting Citizens' Rights; Once is Enough; Guidelines for the Use of Modernized Metric System; Refractory Concrete Strength Measured Under Simulated Usage; Chemical Degradation of Refractory Liners in Coal Gasifier Systems; Data Centers Established to Aid Coal Conversion Industry; Conferences; Publications; Index; News Briefs.

PB80-131022 Not available NTIS
National Bureau of Standards, Washington, DC.
Spherical Acoustic Resonators for Temperature and Thermophysical Property Measurements.
Final rept.,
M. R. Moldover, M. Waxman, and M. Greenspan. 1979, 12p
Pub. in High Temperature - High Pressures 11, p75-86 1979.

A theoretical and experimental study is reported of the advantages and limitations of using the acoustic radial resonances in a spherical cavity to obtain thermophysical property data in dilute gases. The velocity of sound in dilute gases (0.1-0.5 MPa) is now measured with an accuracy of 0.02% and a precision of 0.001%, and a significant increase in accuracy is anticipated. The measurements are at sufficiently low frequencies (3-15 kHz) to be of value in determining thermophysical properties in many polyatomic gases.

PB80-131030 Not available NTIS
National Bureau of Standards, Washington, DC.
Accurate Thermocouple Thermometry.
Final rept.,
L. A. Guildner, and G. W. Burns. 1979, 20p
Pub. in High Temperature - High Pressures 11, p173-192 1979.

To obtain high accuracy by thermocouple thermometry, a combination of factors must be satisfied: a choice of thermocouple consistent with the chemical and physical conditions of the experiment; its annealing, verification of homogeneity and subsequent calibration; the selection of insulators and sheaths; and an installation to achieve adequate temperating and sensing of the desired temperature. Thermocouples that have been standardized are reviewed along with research and development work on W-3%Re/W-25%Re, Nicrosil/Nisil and Pt-Rh combinations that have given improved high-temperature measurements. Thermocouples for high accuracy and stability are recommended for a given temperature range and conditions of experiment, with their sensitivities, stability, and compatible choices of insulators and sheaths.

PB80-131071 Not available NTIS
National Bureau of Standards, Washington, DC.
NBS Provides Voltage Calibration Service in 0.1-10-Hz Range Using AC Voltmeter/Calibrator.
Final rept.,
H. K. Schoenwetter. Dec 79, 6p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Instrumentation and Measurement 28, n4, p327-331, Dec 79.

Prompted by the need to support vibration and pressure measurements at frequencies down to 0.5 Hz (with expected future needs to 0.1 Hz), NBS now offers a calibration service for voltage standards and rms voltmeters in the range of 0.1-10 Hz. The means for the service is an ac Voltmeter/Calibrator, an NBS-developed instrument containing an rms digital voltmeter and ac and dc voltage calibrators. The methods used to calibrate the ac voltage calibrator are discussed; also, application of the ac Voltmeter/Calibrator to the calibration of customers' voltage and voltmeter standards is described. Finally, a multifrequency voltage reference source with frequency-independent amplitude is proposed as a more suitable transfer standard than thermal voltage converters (TVC's) for the 0.1-10 Hz range.

PB80-141096 Not available NTIS
National Bureau of Standards, Washington, DC.
Two-Probe (Spreading Resistance) Measurements for Evaluation of Semiconductor Materials and Devices.
Final rept.,
J. R. Ehrstein. 1979, 66p
Pub. in Proceedings of the Conference on NATO Advanced Study Institute on Nondestructive Evaluation of Semiconductor Materials and Devices. Villa Tuscolano, Italy, September 19-29, 1978, Chapter 1 in Nondestructive Evaluation of Semiconductor Materials and Devices, J. N. Zemel, Ed., p1-66 1979.

This paper, based on a survey of the literature, presents an overview of the spreading resistance

technique for measuring resistivity variations in silicon. It begins with the simple model of ohmic constriction resistance and deviations from this model which are typically experienced. It then extensively covers the state of empirical knowledge regarding specimen and instrument conditions which affect the reliability of the measurement. A description of the formal physical models of the spreading resistance contact ensues. It is noted that when depth profiles of resistivity are required, it is usually necessary to deconvolute data to account for the sampling volume of the spreading resistance probe being larger than the desired data resolution scale. The development of several mathematical schemes to effect this deconvolution is outlined. Finally, borrowing heavily from the literature, numerous examples of applied spreading resistance measurements are given, with emphasis on comparison of resistivity or doping profiles by spreading resistance with those by other profiling techniques common to the semiconductor industry.

PB80-141542 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Dimensions/NBS. Volume 63, Number 11, November 1979.
Monthly rept.
Nov 79, 41p NBS/DIM-63/11
See also Volume 63, Number 6 dated Jun 79, PB-297 836.Color illustrations reproduced in black and white.

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: Meeting Mother Nature on Her Own Turf; The Precisely Precessing Proton; Fire Safety Tips for Wood-Burning Appliances; Tenth Anniversary of NBS-TAPPI Collaborative Reference Paper Program; NBS Announces Four Computer Interface Standards; New Photometric Calibrator Performs Direct Measurement; Girth Weld Standards for Alaskan Natural Gas Pipeline; 'Ultra-Black' Coating for High Absorptance of Solar Energy; Conferences, Publications; News Briefs.

PB80-143993 PC **A12**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Time and Frequency Users' Manual,
George Kamas, and Sandra L. Howe. Nov 79, 258p NBS-SP-559
Supersedes PB-269 220. Library of Congress catalog card no. 79-600169.

This manual has been written for the person who needs information on making time and frequency measurements. It has been written at a level that will satisfy those with a casual interest as well as laboratory engineers and technicians who use time and frequency every day. It gives a brief history of time and frequency, discusses the roles of the National Bureau of Standards, the U. S. Naval Observatory, and the International Time Bureau, and explains how time and frequency are internationally coordinated. It also explains what time and frequency are internationally coordinated. It also explains what time and frequency services are available and how to use them. It discusses the accuracies that can be achieved using the different services as well as the pros and cons of using various calibration method.

PB80-144223 Not available NTIS
National Bureau of Standards, Washington, DC.
Precision and Replication: Critique I.
Final rept.,
H. J. Kostkowski. 1979, 11p
Pub. in Proc. Controlled Environments Working Conf., Madison, WI, Mar 12-14, 1979, p331-341 1979.

This paper consists of: (1) a summary of the standards and calibrations that are pertinent to measurements of controlled environments that are pertinent to measurements of controlled environments that are available from the National Bureau of Standards; (2) estimates of the state-of-the-art accuracy available with commercial instruments; (3) a discussion of why an accurate calibration does not insure an accurate measurement; and (4) some brief remarks about the uncertainty of error estimates.

PB80-805740 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Instrumentation and Data Processing Used in Earth Resources Technology Satellites (ERTS). Volume 2. 1976-1979 (Citations from the NTIS Data Base).
Rept. for 1976-79,
Audrey S. Hundemann. Mar 80, 244p
Supersedes NTIS/PS-79/0206, NTIS/PS-78/0070, and NTIS/PS-77/0081. See also Volume 1, 1973-1975, NTIS/PS-78/0069.

Abstracts are cited dealing with new or improved remote sensing techniques. Topic areas cover pattern recognition, spectrum analysis, image enhancement, photointerpretation, multispectral photography, and mapping. (This updated bibliography contains 237 abstracts, 35 of which are new entries to the previous edition.)

14C. Recording Devices

AD-A079 586/4 PC **A04**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Time Encoder.
Technical note,
Francois Gauthier. Aug 79, 59p Rept no. DREO-TN-79-18
Text in French and English.

This circuit was designed and produced to record every minute, on film, a time code having duration of 1 second; this time code, known as the 'NASA Time Code' is continually repeated every second. The circuit must also be able to record synchronization pulses every 100 milliseconds for the portion of the minute not used by the time code. The combination of these two signals is applied to two light-emitting diodes so as to convert electrical data into usable optical signals. This technical note provides a detailed description on the operation of the time encoder. A technique employed to simulate the time code with the aid of a PDP-11 minicomputer is also presented and is necessary to verify the proper operation of the circuit. (Author)

AD-A079 689/6 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Mechanical Engineering Design of the DREO Optical Recorder for SEASAT.
Technical note,
D. J. Hidson, and V. H. Pede. Sep 79, 37p
Abstract in French.

This paper contains a description of the mechanical engineering aspects of the DREO optical recorder for SEASAT. The concept, design and construction are discussed in detail. The device receives a signal from the satellite and converts it into an intensity modulated line on an oscilloscope. This line is focused by a lens system on to a moving film. The motion of the film allows an image to build up. The speed and tension of the film are controlled by servomotors. The recorder functioned well and produced valuable information before the failure of SEASAT. (Author)

AD-A079 956/9 PC **A03**/MF **A01**
Electronics Research Lab Adelaide (Australia)
A Monitor Unit for Automatically Logging Power Line Disturbances.
Technical rept.,
W. M. Kemp. Sep 79, 38p Rept no. ERL-0104-TR

A portable monitor system has been developed for automatically gathering data on the quality of electrical mains supplies. The equipment will store the number of times overvoltages or undervoltages occur in a chosen period, and will give a breakdown of the data into five disturbance-duration categories, plus an indication of the accumulated disturbance time. The equipment is self-contained and requires no attention during the monitoring period, making it particularly useful for remote or unmanned sites. Up to 100,000 excursions outside the preset thresholds can be tallied in any one period. The unit will continue to acquire and store data through extended mains failures for virtually the shelf life of its internal battery. (Author)

PB80-131089 Not available NTIS
National Bureau of Standards, Washington, DC.
A Simple Technique for Visualizing Transmitted or Reflected Sound Fields.
Final rept.,
D. J. Chwirut. Dec 79, 4p
Pub. in Mater. Eval. 37, n13, p29-32, Dec 79.

A simple apparatus for recording transmitted or reflected ultrasonic fields, in longitudinal or transverse section, is described. The equipment required, in addition to the flaw detector and immersion lab scanner, consists only of two position sensors with power supplies and an analog dc X-Y plotter. This system has been used at the National Bureau of Standards (NBS) for ultrasonic transducer characterization, material evaluation, and defect detection. Examples of usage and output are presented.

14D. Reliability

N80-16356/1 PC **A24**/MF **A01**
M and S Computing, Inc., Huntsville, AL.
Digital Ultrasonic Signal Processing: Primary Ultrasonics Task and Transducer Characterization Use and Detailed Description.
Final Report.
P. L. Hammond. 1 Nov 79, 560p NASA-CR-161370, REPT-79-070
Contract NAS8-33100

This manual describes the use of the primary ultrasonics task (PUT) and the transducer characterization system (XC) for the collection, processing, and recording of data received from a pulse-echo ultrasonic system. Both PUT and XC include five primary functions common to many real-time data acquisition systems. Some of these functions are implemented the same code in both systems. The solicitation and acceptance of operator control input is emphasized. Those operations not under user control are explained.

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-B025 126/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Chemical Systems Lab
A Simplified Methodology for Computing Chemical Hazard Distances.
Technical rept. Sep-Nov 77,
C. Glenvil Whitacre. Jan 78, 32p ARCSL-TR-78010, SBIE-AD-E400070
Distribution limitation now removed.

A simplified methodology is developed for solution to the Gaussian diffusion model when affected by an inversion cap. The Pasquill stability categories are used to characterize atmospheric stability. Distance assessment is made for a specified dosage from a point source release at ground level. Fortran and pocket calculator programs are included. (Author)

15C. Defense

AD-A079 695/3 PC **A11**/MF **A01**
Army Military Personnel Center Alexandria VA
Japan's Defense Policy: Forecast and Implications.
Final rept.,
William Ray Lynch, III. 21 Dec 79, 227p
Master's thesis.

This thesis forecasts Japan's defense posture in the 1980's. The forecast is based on review of Japanese history and elements of national security including the East Asian security environment. Several key variables, including economic growth and rising nationalism, are analyzed for their effect on defense posture. The major conclusion is that Japan is unlikely to move to a significantly stronger defense posture in the 1980's; instead , Japan's most probable course is relatively minor improvements of existing defense forces within present overall defense capabilities. This means that the U. S. can expect to continue to shoulder the major responsibility for Japan's defense, while Japan makes a small but 'respectable' contribution,

which eschews nuclear weapons. A review of analyses and conclusions suggests that both nations need to reconsider their interdependent defense policies in order to provide an improved climate for continued strong ties. In particular, Japan needs to find ways to make an increased common defense contribution, while the U. S. needs to rethink the '1-1/2 wars' policy and improve credibility.

AD-A079 936/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Borders of Our Homeland are Inviolable,
V. Nikolayev. 1 Aug 79, 10p Rept no. FTD-ID(RS)T-1092-79
Edited trans. of Starshina Serzhant (USSR) n4 p14-15 1969, by Victor Mesenzeff.

No abstract available.

AD-A080 022/7 PC **A03**/MF **A01**
Army Russian Inst APO New York 09053
Soviet Ground Forces: Doctrine and Capabilities (European Theater).
Student research rept.,
William Cole. 1979, 27p

The author provides a comprehensive treatment of the relationship between Soviet Ground Force doctrine and actual capabilities to fulfill such doctrine as it relates to East-West confrontation in Europe. Major topics relate to historical development, current disposition, emphasis on offensive operations, numerical superiority, rates of advance, logistics, research and development programs, tactical aviation, and tactical nuclear weapons. Emphasis is placed on Soviet attainment of a viable war-fighting and war-winning capability resulting from the linkage of tactical nuclear and conventional forces. He maintains that such a linkage has given new and sophisticated meaning to the concept of combined-arms operations. He concludes that the Soviet Ground Forces constitute an extremely powerful military establishment, structured for a short, violent war; characterized by high-speed offensive operations preceeded, in all probability, by the initial use of tactical nuclear weapons. As such, the Soviet Ground Forces have the ability to initiate a devastating attack against NATO and Western Europe.

AD-A080 063/1 PC **A10**/MF **A01**
System Planning Corp Arlington VA
Survival during the First Year after a Nuclear Attack.
Final rept.,
Roger J. Sullivan, Kurt Guthe, William H. Thoms, and Frank L. Adelman. Dec 79, 206p Rept no. SPC-488
Contract DCPA01-78-C-0297

A study was performed of survival during the first year after a large-scale nuclear attack against the U.S. Crisis relocation and expedient fallout protection were assumed to have occurred prior to the attack. Survival in the state of Ohio was analyzed in detail. Energy, transportation, food, water, housing, clothing, sanitation, health, communications, emergency services, residual radiation, and environmental effects were all considered. (Author)

AD-B004 947/8 PC **A03**/MF **A01**
Naval Weapons Center China Lake Calif
The Effects of Pattern and Color on the Visual Detection of Camouflaged Vehicles.
Technical publication Dec 74-Mar 75,
Hubert O. Whitehurst. Apr 75, 28p Rept no. NWC-TP-5746
Original contains color plates: All DDC reproductions will be in black and white.
Distribution limitation now removed.

Two camouflage experiments were conducted in which subjects searched for model armored personnel carriers placed singly on a terrain model. The effects of pattern contours, the number of colors used to paint the patterns, and the particular colors used on search times and detection probabilities were measured. Analyses of variance revealed no significant effects due to pattern contours or number of colors, while color per se was found to have a significant effect on search times. No significant differences were found between search times for an olive drab control target and pattern-painted targets. Search times and far visual acuity were found to be significantly correlated. It was concluded that pattern-painting does not affect target detection difficulty under the conditions tested in these experiments. (Author)

AD-B023 039/1 PC **A03**/MF **A01**
Army Infantry School Fort Benning Ga
Independent Evaluation Report for Platoon Early Warning System (PEWS-IER) AN/TRS-2( ).
Final rept. 30 Aug-15 Oct 76,
David P. Spencer. May 77, 32p
Distribution limitation now removed.

The Independent Evaluation Report (IER) addresses the Operational Test II (OT II) of the Platoon Early Warning System (PEWS) AN/TRS-2( ) conducted by the US Army Airborne, Communications Electronics Board (USAACEBD) at Fort Bragg, North Carolina during ther period 30 August 1976 to 15 October 1976. Conclusions developed as a result of the independent evaluation process will be utilized as a basis for development of the TRADOC/USAIS position for the PEWS Development Acceptance In-Process Review (DEVA-IPR) scheduled for 1 June 1977. This evaluation addresses the systems' operational capability, the validity of the logistical concept and the adequacy of the system. Primarily, data from OT II is evaluated in this report; however, data from all sources is considered and used where practical. (Author)

15D. Intelligence

AD-A080 021/9 PC **A06**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Terrain Analysis Procedural Guide for Roads and Related Structures (Report Number 2 in the ETL Series on Guides for Army Terrain Analysts).
Technical rept.,
Theodore C. Vogel. Oct 79, 122p Rept no. ETL-0205
Originals contains color plates: All DTIC and NTIS reproductions will be in black and white. See also rept. no. 3, AD-A080 064.

This report provides step-by-step methods and necessary procedures for obtaining information on roads and related structures, i.e. bridges, tunnels, etc., from U.S. military maps, aerial photography, and other source materials or documents. The Guide war written specifically for the U.S. Army Terrain Analyst and presents the detailed methodology necessary for obtaining approximately 15 data elements concerned with the location and mensurational characteristics of roads and related structures. It is the second in a series of guides for Army Terrain Analysts. (Author)

AD-B024 969/8 PC **A10**/MF **A01**
Bohan (Walter a) CO Park Ridge Ill
Navy Tactical Applications Guide. Volume I. Techniques and Applications of Image Analysis,
Robert W. Fett, and Walter F. Mitchell. Jan 77, 207p NEPRF-AR-77-03
Contract N00228-76-C-3025
Original contains color plates: All DDC reproductions will be in black and white.
Distribution limitation now removed.

Background on the Defense Meteorological Satellite Program (DMSP) is provided, updated for the Navy system and the Block 5-D spacecraft. Geometrical aspects of sunglint are described with nomograms for determining the distance from the subsatellite track to the Primary Specular Point (PSP). Various aspects of sunglint patterns with implications vis a vis determining sea state and low-level wind direction are illustrated and described. The meaning of anomalous gray shade patterns appearing in DMSP Very High Resolution (VHR) visual data is thoroughly explored with examples of each specific cause and suggestions for tactical use. Island and land barrier effects on sea state and atmospheric moisture are illustrated in a variety of different sunglint relationships.

15E. Logistics

AD-A080 039/1 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Evaluation of a Prototype Military Backpack.
Technical note,
B. Farnworth. Nov 79, 17p Rept no. DREO-TN-79-25
Abstract in French.

A prototype backpack under development by DCGEM has been tested by human subjects running an obstacle course. It was found to be more comfortable and marginally less of an encumbrance than the standard Canadian Forces rucksack. (Author)

AD-A080 060/7 PC **A02**/MF **A01**
Coast Guard Research and Development Center Groton CT
Marine Traffic Data of Chicago, Illinois and the South Shore of Lake Michigan.
Final rept.,
J. J. Cherny, III, R. A. Silva, M. R. Young, and B. H. Charters. Sep 79, 16p CGR/DC-18/79, USCG-D-74-79

Data was collected on the marine traffic and VHF-FM marine communications channel usage at Calumet Harbor, Chicago Harbor, and Lemont, Illinois, at the junction of the Chicago Sanitary and Ship Canal and Calumet-Sag Channel, during the period of 7-29 June 1978. The marine traffic data was recorded by means of time-lapse photography of a radar display. Recordings were made of the communications on VHF-FM maritime mobile Channels 13 and 16 as received at the sites. The daily average of marine traffic, including large, medium, small and anchored vessels, and tugs-in-tow, transiting the Calumet Harbor/Indiana Harbor area is 48; and transiting Chicago Harbor is 312. The daily average of tug/barge and small vessel transits on the Chicago Sanitary and Ship Canal is 30; the Calumet-Sag Channel is 11. Approximately 300 hours of communications of VHF-FM Channel 16, and 150 hours of VHF-FM Channel 13,,were recorded and monitored to determine channel efficiency (i.e., percentage of valid messages) and utilization. Channel 13 efficiency for the period of data collection is 0.0%, utilization 0.02%. Channel 16 efficiency at Calumet Harbor is 47.76%; at Chicago Harbor, 66.50%; and at Lemont, 64.72%. (Author)

AD-B024 755/1 PC **A08**/MF **A01**
Military Traffic Management Command Transportation Engineering Agency Newport News VA
Analysis of MTMC Participation in the REFORGER 77 Exercise.
Final rept.,
Gary R. Bill, William C. Richards, Raymond A. Schaible, and Edward H. Grazier. Feb 78, 174p Rept no. MTMC-0A-77-2
Distribution limitation now removed.

This analysis of the Military Traffic Management Command's (MTMC) participation in the REFORGER 77 exercise provides a documentary narrative of the exercise deployment and redeployment, and an evaluation of the MTMC performance in the discharge of its REFORGER mission. Although problems in planning and execution have been identified and corrective actions recommended, the deployment and redeployment of the 1st and 4th Infantry Divisions (Mechanized)(-) was a highly successful operation. REFORGER 77 clearly demonstrated the Defense Transportation System's total approach capability to support the movement of the equipment of a mechanized infantry division from a CONUS origin to a potential combat employment destination overseas.

PAT-APPL-6-063 605 PC **A02**/MF **A01**
Department of the Navy Washington DC
Universal Cargo Restraint System.
Patent Application,
John J. Delatush. Filed 3 Aug 79, 14p AD-D006 813/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

It is an object of the present invention to provide a universal cargo restraint system which can be easily and quickly installed in, or removed from, a large variety of shipping containers, regardless of shape or size, to positively secure cargo, particularly in less-than-containerload shipments. Another object is to provide a cargo restraint system which will minimize container and restraint system

inventories, and reduce loading and unloading time. Still another object is to provide a cargo restraint system which can be economically installed in a container and removed after only one usage, which reduces dunnage and the time necessary to position and trim the cargo in the container. A still further object is to provide a restraint system which is capable of uniformly distributing high dynamic forces imparted within the container, and which improves safety to both the handling personnel and cargo. Briefly, these and other objects and aspects of the present invention are achieved by a novel and improved universal cargo restraint system in which four cables are respectively anchored to the corners of the shipping container forward wall and extend rearwardly to threaded rods passing through the corners of a movable rear bulkhead which is formed to engage the rearward surfaces of cargo modules.

PB80-138761 PC **A03**/MF **A01**
Lykes Bros. Steamship Co., Inc., New Orleans, LA.
Equipment Control System.
Final rept. Jun 75-May 79,
J. Baine Fox. May 79, 31p MA-RD-930-80029
Contract MA-5-38040

This report describes the technical and operational features of a computerized system to control the use of container, chassis, and barge equipment by Lykes Brothers Steamship Company. This project included the design, development, implementation, operation, and evaluation of the Equipment Control System. Lykes estimates a savings of up to 10 percent of equipment lease costs and an improved utilization of container equipment up to 15 percent. The report includes a discussion of the computer hardware and software utilized and the user's perspective following the initial operating period.

PB80-145949 Mag Tape $2300.00
Defense Logistics Services Center, Battle Creek, MI.
Master Cross Reference List, Part 1.
Data file,
Melvin Beesley, and Trudy Sieveking. Apr 80,
mag tape DSA/DF-80/005
Supersedes rept. no. DSA/DF-79/014, PB-298 538.

Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

Part 1 of the Master Cross Reference List is a Master List of Logistics Reference Numbers cross-referenced to their applicable National Stock Number(s) in the Federal Catalog System. It contains four basic elements of data: (1) Logistics reference number, assigned by the manufacturers; (2) Manufacturers code identifying the manufacturer; (3) Reference number variation code, indicating whether the reference number is item identifying or requires additional data to correctly identify the item of supply; (4) National stock number/permanent system control number.

15F. Nuclear Warfare

AD-A079 702/7 PC **A05**/MF **A01**
Bdm Corp McLean VA
Measures of Effectiveness for Shipboard Nuclear Weapons Physical Security Systems.
Final rept. 25 Jun-25 Dec 79,
W. T. Ober, II, C. H. Hanks, M. F. Shields, J. C. Evans, and M. L. Fineberg. 24 Dec 79, 92p Rept no. BDM/W-79-729-TR
Contract N60921-79-C-0101

This report provides an analysis of the shipboard nuclear weapon physical security problem and develops a framwork of measures of effectiveness (MOE) which can be used to objectively assess, evaluate, and compare the performance and effectiveness of physical security systems for shipboard nuclear weapons. Topics covered include: Identification of measurable security system operational characteristics; Definition of functional measures of effectiveness; Methods for determining functional MOE values; and Integration of functional MOEs into combined MOE expressions for evaluation of total SNWS systems. (Author)

AD-A079 944/5 PC **A03**/MF **A01**
Science Applications Inc La Jolla CA
Multiweapon Optimizer for Strategic Targets (MOST). Volume I.
Final rept. 5 Jul 77-30 Apr 78,
L. J. Nesseler. 30 Apr 78, 35p SAI-78-631-LJ, DNA-5018F-1, AD-E300 650
Contract DNA001-77-C-0275
See also Volume 2, AD-A079 945.

The MOST code (for Multiweapon Optimizer for Strategic Targets) is designed to find a aimpoints for nuclear weapons assigned to complex targets such as airfields. It finds the minimum number of weapons needed to accomplish the objective of an attack and optimizes aimpoints for them. Although designed primarily for Poseidon RV's in its current form it will handle any problem in which identical yields are used. There are two kinds of attack objectives that may be specified. The first attack objective is the achievement of at least a minimum probability of damage against each of the elements of the complex. The second objective is to achieve a required level of damage to the complex as a whole. It is assumed that each element of the complex is assigned a value against which other elements can be weighed, and that the value-weighted probability of damage to an element is the probability of damage to it multiplied by its value. This second objective, then, is to achieve at least a minimum required value-weighted average probability of damage on the entire complex (which is the sum of the value-weighted probabilities of damage of all of the elements divided by the total value of the complex). Compounded probabilities of damage , due to multiple bursts, are taken into account in the achievement of this second objective, and the value-weighted average PD is maximized during aimpoint optimization. Co-located targets (not part of the complex) have been taken into account, and may be given a high probability of damage requirement independent of the requirement of the complex.

AD-A079 945/2 PC **A02**/MF **A01**
Science Applications Inc La Jolla CA
Multiweapon Optimizer for Strategic Targets (MOST). Volume II. User's Guide.
Final rept. 5 Jul 77-30 Apr 78,
L. J. Nesseler. 17 Jul 78, 23p SAI-78-765-LJ, DNA-5018F-2, AD-E300 651
Contract DNA001-77-C-0275
See also Volume 1, AD-A079 944.

MOST is a computer program (for Multiweapon Optimizer for Strategic Targets) which finds the fewest number of nuclear weapons necessary to attack a complex of targets. This is a user's guide to the code. (Author)

15G. Operations, Strategy, and Tactics

AD-A079 932/0 PC **A04**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Submarines against Submarines (Selected Articles),
N. I. Suzdalev. 5 Jul 79, 52p Rept no. FTD-ID(RS)T-0879-79
Edited trans. of mono. Podvodnyye Lodki Protiv Podvodnykh Lodok, Moscow, 1968, p3-7, 127-162, by John Hanus.

No abstract available.

AD-A080 067/2 PC **A03**/MF **A01**
Rand Corp Santa Monica CA
Defense Modernization in the People's Republic of China.
Interim rept.,
Jonathan D. Pollack. Oct 79, 32p Rept no. RAND/N-1214-1-AF
Contract F49620-77-C-0023

Chinese decisionmakers have used various strategies in their past efforts to modernize their defense establishment. Any effort to amend previous strategies will be constrained both by the competing demands of other economic sectors and by continuing deficiencies in China's scientific and industrial manpower base. Affecting these constraints in a significant way can succeed only as part of a systematic long-term development effort. A 'quick-fix' defense option for the PRC (that is, one premised on rapid assimilation of advanced foreign military technologies and extensive weaponry purchases abroad) is not feasible for Chinese security planners. To attempt such a strategy would severely tax the available budgetary and manpower resources. It would also compromise a 20 year effort to create an indigenous base for military reseach and production, even though the domestic defense industries lag significantly behind the technological capacities of the superpowers. Of necessity, therefore, Chinese security strategy will continue to rely heavily on both a political and diplomatic component, rather than depending exclusively upon military acquisitions and deployments.

AD-B010 926/4 PC **A04**/MF **A01**
Rome Air Development Center Griffiss AFB N Y
Project SEEK SCREEN. Volume II. Tactical Air Control System.
Rept. for Jan-Jul 75,
Joseph T. Massoud. Apr 76, 68p Rept no. RADC-TR-75-320-Vol-2
See also Volume 5, AD-B011 012L.
Distribution limitation now removed.

The mission of the Tactical Air Force component of the Joint Task Force (JTF) is to plan, direct, control and coordinate the resources assigned or attached for the conduct of Tactical Air Operations. These operations include: Close Air Support, Air Interdiction, Counter Air (Offensive and Defensive), Air Reconnaissance, Tactical Airlift, Air Refueling, Air Rescue, Special Operations. The Tactical Air Force Component Commander is assisted in the accomplishment of these missions by the Tactical Air Control System (TACS). The TACS development program is an evolutionary effort. The initial system development was performed under the 407L TACS program. The 407L TACS then formed the baseline system for the 485L TACS improvement effort. The TACS is composed of four basic subsystems. Aircraft Control and Warning Subsystem (AC and W); Tactical Air Support Subsystem (TAS); Air Traffic Control Subsystem (ATC); Command Communications Subsystem. These four subsystems and their respective functional elements are discussed in this report.

AD-B013 302/5 PC **A06**/MF **A01**
Army Electronics Command Fort Monmouth N J
A Methodology for Predicting Ammunition Requirements as a Function of Force Size.
Final rept.,
Edward M. Kelley. 11 Jun 76, 107p
Master's thesis.
Distribution limitation now removed.

Fundamental to military planning is accurate prediction of ammunition requirements to support combat operations. Although this is a recognized fact, it is an area of planning with many uncertainties, misconceptions, and a widespread lack of understanding. In dealing with this general problem, this thesis addresses the more specific problem of the relationship of ammunition requirements as a function of the size of the force under consideration. A methodology which relates ammunition requirements to the size of the force in terms of the number of weapons of a given type in the force is proposed. A modification of the Delphi method is applied to determine the validity of the results of the application of the methodology.

AD-B013 459/3 PC **A04**/MF **A01**
Naval Weapons Center China Lake Calif
A Continuous Stochastic Model for Penetration Problems.
Technical publication Sep 75-May 76,
Frank C. Reed. Jun 76, 60p Rept no. NWC-TP-5841
Distribution limitation now removed.

This report is concerned with the problem of estimating the survival of elements of a penetrating attack force using a variety of penetration aids. This problem has a long history, having been investigated by a number of aircraft, research, and government organizations. Most approaches to the problem are based on the fact that the status of the penetrating force depends on a time sequence of events with the property that each event depends upon the history of previous events, all actions that have been taken, and random outcomes associated with these events and actions. The level of detail in the modeling usually dictates

the proper approach to the problem. Simple formulations may be handled using elementary methods of probability. Complex versions of the problem require either Monte Carlo or Markov Chain solutions. Both Monte Carlo and Markov Chain approaches keep track of changes in the state of the penetration process as discrete time events and random outcomes based on these events and the current state of the process occur. The Markov Chain solution actually requires discrete time updating of the probability distribution defined on the state space. There are certain size state space problems for which the Markov Chain approach is preferred over the Monte Carlo approach.

AD-B021 970/9 PC **A02**/MF **A01**
Air Force Armament Lab Eglin AFB Fla
Generating Weather Data for Linear Weapons Allocation Models.
Final rept. Jan-Jun 75,
James V. Blowers. Jun 75, 22p Rept no. AFATL-TR-75-86
Distribution limitation now removed.

Some weapons allocation models that use linear programming techniques have a capability of taking weather into account. These models require as input the probability that the weather at a given location and a given time is within given limits, usually determined by launch envelopes of weapon systems. This report shows one way in which raw data provided by the Air Weather Service can be converted into a form useable by these models. (Author)

PB80-140437 PC **A25**/MF **A01**
Smithsonian Institution, Washington, DC.
The Fleet in the First World War. Volume I. Operations of the Russian Fleet,
N. B. Pavlovich. c1979, 578p TT-72-52015
Trans. of mono. Flot v Pervoi Mirovoi Voine, Moscow, 1964, by C. M. Rao. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Among the many works on the First World War there has been no comprehensive account of the Russian navy's part in that epic clash of the great powers. This gap is now filled by the present volume, which takes its place as the authoritative record of the Russian fleet's day-by-day contribution to the war at sea from 1914 through 1917, when the revolutionary Bolshevik government took Russia out of what it saw as a purely imperialistic confrontation. The story of the tortuously slow growth of the tsarist navy is told against the background of war preparations by Germany, France and England. We learn that through the vision and persistence of a few leaders Russia's posture both on land, at sea and in the air at the outbreak of the war could inspire a measure of confidence. The deeds of the Russian navy are recounted on the basis of the three theaters where it operated: the Baltic Sea, the Black Sea and the White Sea and adjoining coastal waters. The sections under these three heads give a year-by-year account of the fighting at sea against the background of the general progress of hostilities, particularly on the land front. The account concludes with the overthrow of the Tsar, the brief transition of Bolshevik rule, and the upheaval these developments produced in the Russian navy, which played a not inconsiderable part in hastening the process.

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

PATENT-4 185 538 Not available NTIS
Department of the Navy Washington DC
Simplified Air System for Underwater Rocket Launching.
Patent,
Edward J. Barakauskas. Filed 30 Aug 60, patented 29 Jan 80, 6p AD-D006 880/9, PAT-APPL-053 021
Supersedes PAT-APPL-053 021-60.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a missile launching system comprising a launching tube including a first chamber and a second chamber containing the missile to be launched, a source of gas compressed to a pressure substantially in excess of the pressure of the environment into which the missile is to be launched, and valve means for admitting said compressed gas into said first chamber a bulkhead between said first and second chambers, said bulkhead being formed with a plurality of openings, a plate formed with similar openings mounted for rotation on said bulkhead, and means for rotating said plate to gradually align the openings of the plate with the openings of the bulkhead during the launching movement of the missile in the launching tube to continually increase the flow of compressed gas from the first chamber to the second chamber causing a rapid rise of pressure in said first chamber and resultant constantly increasing pressures communicated to said second chamber via said adjustable orifice for launching said missile.

16B. Missile Trajectories

AD-A080 028/4 PC **A03**/MF **A01**
White Sands Missile Range NM
Application of Robust Filtering and Smoothing to Tracking Data.
Technical rept.,
William S. Agee, Robert H. Turner, and Jose E. Gomez. Dec 79, 34p Rept no. WSMR-TR-71

Robust methods provide a fresh approach to the treatment of outliers or wild observations in filtering and smoothing applicatons. The robust M-estimates of regression are extended to filtering and fixed lag smoothing by employing a pseudo density of the observatons in the derivations of the filter and fixed lag smoother. These robust methods are applied to tracking data to obtain improved estimation performance in the presence of wild observations. The improvement in estimaton performance is evaluated via Monte Carlo using simulated tracking data. (Author)

AD-B015 279/3 PC **A07**/MF **A01**
Trw Defense and Space Systems Group Redondo Beach Calif
Flow Properties in the Near Wake of Hypersonic Vehicles at Low Altitudes.
Final rept. May 75-Sep 76,
J. T. Ohrenberger. Sep 76, 132p TRW-27816-6001-RU-00, RADC-TR-76-298
Contract F19628-75-C-0160
Distribution limitation now removed.

The boundary layer and near base region of three reentry vehicles were calculated under conditions of a turbulent boundary layer and wake. Flow properties affecting the transmission of electromagnetic signals from the base region are presented and include predictions of the charged particle densities and collision frequencies. The possible simulation of a full scale vehicle by a vehicle of smaller size whose heatshield is intentionally seeded with 'low ionization potential' materials is investigated and found to be feasible within reasonable engineering limits. Reentry heating and detailed boundary layer analyses were performed to establish the fluid profiles at the aft station of the vehicles. Boundary layer separation and the near wake flowfield was determined by a self-consistent viscous-inviscid interaction theory. A single non-equilibrium reaction was used to determine the electron concentration profiles above the recirculation region, while equilibrium thermodynamics was applied to determine the neutral and charged species concentrations in the recirculation region.

AD-B022 461/8 PC **A05**/MF **A01**
Systems Control Inc Palo Alto Calif
Ballistic Reentry Vehicle Aerodynamic Coefficient Estimation Using an Advanced System Identification Technique.
Final rept. 1 Mar 76-1 Mar 77,
Narendra K. Gupta, and W. Earl Hall, Jr. Aug 77, 96p SCI-5412-002, SAMSO-TR-77-50
Contract F04701-76-C-0127
Distribution limitation now removed.

This report develops post-flight data processing methods for aerodynamic coefficient estimation of ballistic reentry vehicles based on advanced system identification technology. This post-flight data processing involves reconstruction of unmeasured channels, aerodynamic coefficient model structure determination and maximum likelihood parameter estimation. The methods are verified on a simulation trajectory and on a flight test trajectory. It is shown that the techniques are general enough to handle a variety of regimes encountered by a typical ballistic reentry vehicle. (Author)

N80-16085/6 PC **A03**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
Dynamic Analysis of Beam-Rider Missile Performance.
J. Shinar, E. Besner, and Y. Rotsztein. Aug 79, 29p TAE-376

Performance of a point defense beam rider missile system with linearized trajectory equations is analyzed taking into account the dynamics of the guidance loop. It is shown that adding a lead term, proportional to the line of sight turn rate, to the guidance command improves the system performance against maneuvering targets at the expense of increased noise sensitivity. A formal solution to the problem of optimal avoidance of beam rider missiles is also presented indicating a 'bang-bang' type evasive maneuver.

16C. Missile Warheads and Fuses

AD-B015 617/4 PC **A03**/MF **A01**
Naval Weapons Center China Lake Calif
Development of Optimum Theoretical Warhead Design Criteria.
Final rept. Jan-May 76,
T. Zulkoski. Dec 76, 39p Rept no. NWC-TP-5892
Distribution limitation now removed.

A study was conducted to develop optimum theoretical warhead design criteria. Weight, diameter and length constraints were considered based on a solid cylinder with no end confinement. End effects were also considered and treated using correction factors in the form of exponential functions of length-to-diameter ratios. Using these parameters, three general qualitative conclusions were drawn: (1) the greater the warhead length, the greater its initial fragment kinetic energy, (2) the mathematical models developed indicate that the optimum charge-to-metal mass ratio (C/M) is greater than 1.4 and that a decreased length-to-diameter ratio results in higher optimum C/Ms; and (3) optimum warhead case material, from the standpoint of initial fragment kinetic energy, is a function of warhead weight, length and diameter. (Author)

PATENT-4 185 558 Not available NTIS
Department of the Air Force Washington DC
Re-Entry Vehicle Boundary Layer Transition Suppressor.
Patent,
James A. Quinville. Filed 23 Apr 68, patented 29 Jan 80, 4p AD-D006 849/4, PAT-APPL-725 582
Supersedes PAT-APPL-725 582-68.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Boundary layer transition is delayed on a re-entry vehicle by making use of the differential pressure that normally exists between the surface of a re-entry vehicle and the base region of the vehicle. Choked flow orifices are provided on the surface of the vehicle at the input to the internal ducting leading to the base region of the vehicle. (Author)

16D. Missiles

AD-A080 080/5 PC **A02**/MF **A01**
Sri International Menlo Park CA
Calculation of the Response of Adaption Kits in Accidental Side Impacts.
Bimonthly progress rept. no. 8, 3 Jul-2 Sep 79,
J. K. Gran, and L. E. Schwer. Nov 79, 24p
Contract DAAK10-78-C-0158

This report describes the current study of the response of adaption kits in accidental side impacts.

The primary goal of the project is the further development of finite element models for a generic missile structure so that adaption kit response, particularly component accelerations, can be predicted for side impacts of the missile. An additional goal is experimental determination of the impact response of a missile structure that contains a hard link safe-arm device. The work planned for this contract consists of four tasks. In Task 1, we are further developing finite element models for substructures and checking the models' predictions against experimental data. In Task 2, we are using the models to calculate the response of complete structures, again by comparing the predictions with experimental results insofar as feasible. In Task 3, we are transferring the analytical capabilities developed in Tasks 1 and 2 by implementing the SUPER code at ARRADCOM. In Task 4, we are performing impact experiments on scale models of a specific prototype missile structure to help plan some full-scale tests.

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A079 756/3 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
A Steady-State Analysis of Candidate Towing Cables for a Deep-Towed Geophysical Array System.
Technical note,
Darrell A. Milburn, and Martin G. Fagot. Mar 79, 37p Rept no. NORDA-TN-40

The relative performance of two candidate towing cables for the proposed Deep-Towed Geophysical Array System is examined. A preliminary design of this ship-towed system is presented. It includes a description of the candidate towing cables and a towed body, which is composed of an instrumented fish and a long, nearly neutrally buoyant seismic streamer. Using a two-dimensional steady-state analysis, towing cable geometry and tensions are predicted for the body depths specified and for a series of towing speeds. Results of the analysis are presented graphically and shown not only the effects of body depth and towing speed, but the effects of cable drag coefficients and body downforce as well. These results are then used in conjunction with constraints on cable length and design tension to predict maximum towing speeds. Although based on a particular design, the information contained in this report provides useful guidance to further assist in the engineering development of the overall system. (Author)

AD-A080 019/3 PC **A03**/MF **A01**
Naval Underwater Systems Center Newport RI
Computer Aided Parametric Sonar Design Update.
Technical memo.,
Edmund C. Gannon, and R. P. Pingree. 30 Oct 73, 37p Rept no. NUSC-TM-TD1X-59-73

A computer program was written that simplifies the design of parametric sonars. This program has since been modified to update the calculation for secondary directivity index and to include calculations for secondary beamwidth and primary beamwidth. The tolerance on the determination of secondary source level has been reduced from + or - 1.0 dB to + or - 0.5 dB with a consequent tightening of tolerances on all other related calculated quantities. Finally, a new plotting method has been introduced to give plots in the form of families of curves for ease of design analysis. (Author)

AD-A080 036/7 MF **A01**
Naval Underwater Systems Center Newport RI
Computer Aided Parametric Sonar Design.
Technical memo.,
Edmund C. Gannon, Robert P. Pingree, and A. J. Van Woerkum. 23 May 73, 42p Rept no. NUSC-TM-TDIX-33-73
Availability: Microfiche copies only.

A computer program was written that enables the design of parametric sonars. This program accepts as inputs temperature, salinity, depth, estimates of projector area, desired secondary source level and secondary frequency. The program computes various parametric sonar quantities among them primary source level, directivity index and primary operating frequency. The program actually generates a matrix of possible design values that permit the designer to choose those which best suit his needs based on other system considerations. The design program is written in Fortran V for use on the Univac 1106. The program is completely general and any of the input parameters can be varied while holding the others constant. A discussion on how to use the program as well as a sample example is included. (Author)

17B. Communication

AD-A079 593/0 PC **A02**/MF **A01**
Joint Tactical Communications Office Fort Monmouth NJ
An Analysis of the Joint Tactical Information Distribution System (JTIDS) as a Mobile Subscriber Equipment (MSE) Alternative.
20 Sep 79, 14p Rept no. TTO-ENG-084-79

This report examines the technical feasibility of developing a Mobile Subscriber Equipment (MSE) Subsystem utilizing the existing Joint Tactical Information Distribution System (JTIDS) Architecture which could meet the existing operational requirements as defined in the Joint Operational Requirements (JOR) for Mobile Subscriber Equipment. A comparison of the two system architectures (TRI-TAC + JTIDS) is made with a breif description of some of the more significant problems that would result from integration of two systems. (Author)

AD-A079 611/0 PC **A06**/MF **A01**
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Continuation of Research in the Application of Analog Sampled Data Signal Processing to Low-Cost Speech Bandwidth Compression.
Final status rept. 1 Jul 77-30 Jun 78,
R. W. Brodersen, and P. R. Gray. 30 Jun 78, 119p
Contract N00173-78-C-0230

This final report covers the research on low cost implementation of analysis and synthesis of speech using linear predictive coding (LPC). The report is in two completely separate parts which were originally the reports for Masters of Science projects by Paul Hurst (Part I) and Eugene Evancoe (Part II). Part I describes an approach to adaptive autocorrelation analysis which could be implemented using analog sampled data techniques for multiplication and filtering. Part II is an investigation of the use of high order switched-capacitor ladder filters for use as an LPC synthesis filter. (Author)

AD-A079 730/8 PC **A03**/MF **A01**
University of Southern California Marina Del Rey Information Sciences Inst
DoD Standard Internet Protocol,
Jon Postel. Jan 80, 42p
Contract DAHC15-72-C-0308

The Internet Protocol is designed for use in interconnected systems of packet-switched computer communication networks. Such as system has been called a 'catenet'. The internet protocol provides for transmitting blocks of data called datagrams from sources to destinations, where sources and destinations are hosts identified by fixed length addresses. The internet protocol also provides for fragmentation and reassembly of long datagrams, if necessary, for transmission through 'small packet' networks. This document is based on five earlier editions of the ARPA Internet Protocol Specification, and the present text draws heavily from them. There have been many contributors to this work both in terms of concepts and in terms of text. This edition revises the details security, compartmentation, and precedence features of the internet protocol. (Author)

AD-A079 889/2 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Military Message Experiment, Mid Experiment Report.
Memorandum rept. Nov 78-Mar 79,
J. W. Kallander, N. C. Goodwin, S. Hosmer, C. Smith, and D. Fralick. 16 Nov 79, 68p NRL-MR-4094, AD-E000 354

The Military Message Experiment (MME) is designed to evaluate the utility of user-oriented message processing systems in a military environment and to aid in determining the features useful in such a system. The experiment is a cooperative effort between the Commander-in-Chief, Pacific, the Navy, and the Defense Advanced Research Projects Agency. To conduct the experiment, a PDP-10 based system has been installed at CINCPAC Headquarters for use by a portion of the Operations Directorate. The message processing functionality is provided by SIGMA, a program written by the Information Sciences Institute of the University of Southern California. It is supported by the TENEX operating system, and the user terminals are modified HP-2649A CRTs. The MME system is designed to give the user the capability to handle his message traffic (both incoming and outgoing, formal and informal) on the system. The system enforces multilevel security rules based on a modification of the security kernel model developed at Mitre. The rule enforcement is not rigorous enough for certification, but it is sufficiently rigorous to determine the effects on the user's message-related tasks are provided by the system: message distribution and redistribution, 'electronic readboard' construction, message filing, message replies, message commenting and 'chopping,' and message release.

AD-A079 935/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Selected Problems in Operational Reliability of Telecommunications Networks,
Henryk Baczko. 27 Jul 79, 17p Rept no. FTD-ID(RS)T-0916-79
Edited trans. of Przeglad Telekommunikacyjny (Poland) v51 n2 1978, by John Hanus.

No abstract available.

AD-A079 946/0 PC **A07**/MF **A01**
Bdm Corp McLean VA
TRACE Computer Model User's Guide.
Topical rept. Mar 78-Feb 79,
D. L. Porter, and R. H. Schmidt. 12 Oct 79, 130p BDM/W-78-776-TR, DNA-4351T-2D, AD-E300 653
Contract DNA001-78-C-0175

This document specifies and describes the input data, procedures and job control language needed to use the TRACE digital computer simulation model as well as outputs that are available. TRACE (TCOR Revised to Assess Communications Effectiveness) is an extension and enhancement of TCOR, a theater level tactical combat simulation, emphasizing tactical communications performance in a mixed conventional and nuclear conflict environment. Introductory material is included to minimize reference to other TCOR and TRACE documentation. (Author)

AD-A079 947/8 PC **A07**/MF **A01**
Bdm Corp McLean VA
European Theater Command, Control, and Communications (ETC3) Computer Model User's Guide.
Topical rept. 1 Oct 77-10 Apr 79,
P. Bogue, and J. Sanders. 10 Apr 79, 148p DNA-4351T-2C, AD-E300 652
Contract DNA001-78-C-0077
See also report dated 30 Nov 78, AD-A077 617.

DRAFT report intended to provide the user of the European Theater Communications, Command, and Control (ETC3) computer model with all information required to operate the program. (Author)

AD-B003 458/7 PC **A09**/MF **A01**
Computer Sciences Corp Paramus N J
Integrated Switching/Multiplexing/Technical Control.
Final technical rept. Jun 73-Jun 74,
Robert Waxman, Jerry Wald, and Walter Gluchoski. Mar 75, 194p CSC-TR-74-4413, RADC-TR-75-42
Contract F30602-73-C-0335
Distribution limitation now removed.

This study is an investigation of the feasibility of combining the communication functions of circuit

switching, multiplexing and technical control into a single transportable integrated communication complex suitable for use in a tactical environment. The communication system is intended for use in the 1980's when tactical networks will operate digitally. A tradeoff comparison is conducted to determine the relative merits of various candidate switch matrices with respect to size, weight, cost and power consumed and also the impact on the communication functions of transmission, common control, technical control, and signaling. The impact of integrating the technical control function into the communications complex is discussed with respect to quality monitoring and testing, fault isolation, alternate routing, and reporting and recordkeeping. Common processor requirements relating to the integration of technical control and switching functions are described. Program descriptions and memory sizing estimates are given for a baseline system for several different switch sizes. (Author)

AD-B011 012/2 PC **A03**/MF **A01**
Rome Air Development Center Griffiss AFB N Y
Project SEEK SCREEN. Volume V. TACS Communication Equipment.
Final rept. Jan-Jul 75,
JACK A. Mineo. Apr 76, 50p Rept no. RADC-TR-75-320-Vol-5
See also Volume 1, AD-C005 907L.
Distribution limitation now removed.

The Communication and Navigation radio equipments to be examined by the study is limited to a representative class of radio equipments which are now directly chargeable to the 407L/485L system and encompass the various data/voice transfer modes. The capabilities of these radios will be used to generate ECM vulnerability baseline to which short and long term ECCM capabilities can be accomplished. Any known, new or replacement, equipments or systems envisioned or now in planning for use within TACS will also be included to evaluate their ECCM capabilities. The equipments chosen are outlined in the report. They are described in the data sheets by nomenclature and subdivided into navigation and communication headings. (Author)

AD-B013 378/5 PC **A07**/MF **A01**
North Electric CO Galion Ohio
Two/Four Wire Digital Subset.
Final technical rept. Jun 74-Jun 76,
Kenneth Hagstrom, Philip J. Kiley, Don Snyder, and Vishwas R. Godbole. Jul 76, 136p RADC-TR-76-144
Contract F30602-74-C-0300
See also AD-A011 729.
Distribution limitation now removed.

This experimental hardware of a two/four wire digital subset was designed and fabricated for use to test, evaluate and demonstrate technical feasibility of simultaneous full duplex digital communications (voice and data), at 16 and 32 Kbps, over a pair of conductors (2 wires) heretofore only possible over 2 pair of conductors (4 wires). Technical/operational feasibility was successfully demonstrated over 4 kilometers of wire without any degradation of voice quality. Test results support conclusions that a 2-wire line transmission circuit can be shared for accommodating simultaneous full duplex voice/data communications with the same performance obtained over 4-wire circuits in a more cost effective manner (ratio of 2-1 cost reduction in outside cable plant facilities). (Author)

AD-B014 579/7 PC **A06**/MF **A01**
Spectronics Inc Richardson Tex
EMI/EMP Resistant Data Bus.
Final techincal rept. 1 Oct 73-19 Sep. 75,
John E. Shaunfield. Sep 76, 115p AFAL-TR-76-99
Contract F33615-74-C-1001
Distribution limitation now removed.

This document is the final report of a development program concerned with the design and fabrication of an eight station EMI/EMP resistant avionic data bus. Airborne avionics systems are moving toward the use of party line multiplex data buses for the transmission of the growing number of digital signals found in modern aircraft. Optoelectronic technology provides a data bus interface system consistent with military requirements that is potentially superior to wire techniques-particularly in the areas of ground loop noise immunity and EMI/EMP sensitivity. The passive optical couplers developed on the initial phase of this program are a necessity for the realization of a true optical bus. The optical couplers are required in an optoelectronic data bus so that each station can receive optical signals from the bus and transmit optical signals onto the bus. By this means, each station on the bus can communicate with every other station. The report emphasizes the design approach and characteristics associated with the critical opto-electronic interfaces. Overall system description is also presented. The system features eight Multiplex Terminal Units (MTU) inter-connected with a nine port radial coupler. Plugable optical interfaces are employed with fiber optic cable lengths of 10 ft., 20 ft., 30 ft., and 50 ft. This provides for a maximum bus length of 100 ft. The system uses unipolar Manchester coding on the optical bus with a data rate of 10 M bit/s and a worst case bit error rate of 1 in 100 million.

AD-B019 648/5 PC **A03**/MF **A01**
Army Electronics Command Fort Monmouth N J
Short-Range Radio Communications System for Military Operations in Built-up Areas.
Final rept. Jun 75-Jun 76,
K. Ikrath, W. Skudera, and C. M. DeSantis. Mar 77, 27p Rept no. ECOM-4481
Distribution limitation now removed.

Dispersive-surface-acoustic wave devices were employed in an experimental spread-spectrum communications system for the transmission of voice and tone signals via radio and via urban media. A short-range clandestine communications capability was demonstrated with this system competing with standard VHF radio transceivers. (Author)

N80-16084/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Satellite Time Transfer Via Tracking and Data Relay Satellite System (TDRSS) and Applications.
A. R. Chi. Dec 79, 23p NASA-TM-80605
Conf-Presented at the 11TH Ann. Precise Time and Time Interval Applications and Planning Meeting, Greenbelt, MD., 27-29 Nov. 1979.

With two geosynchronous relay satellites the tracking and data relay satellite system (TDRSS) can provide nearly worldwide coverage for communication between all near orbiting satellites and the satellite control center at Goddard Space Flight Center. Each future NASA satellite will carry a TDRSS transponder with which the satellite can communicate through a TDRSS to the ground station at White Sands, New Mexico. It is using this system that the ground station master clock time signal can be transmitted to the near Earth orbiting satellite in which a clock may be maintained independently to the accuracy required by the experimenters. The satellite time transfer terminal design concept and the application of the time signal in autonomously operated spacecraft clock are discussed. Some pertinent TDRSS parameters and corrections for the propagation delay measurement as well as the time code used to transfer the time signal are given.

N80-16647/3 PC **A05**/MF **A01**
Ionospheric Prediction Service, Darlinghurst (Australia).
Ionospheric Storm Effects on Maximum Usable Frequencies on Circuits around Australia.
L. F. Mcnamara. Apr 77, 99p IPS-R-35

The effects of ionospheric storms on the maximum usable frequency (MUF) for circuits around Australia were investigated. The results are discussed in terms of the ionospheric parameter foF2, which is directly related to the MUF. Tables are given which list the probability of a storm effect as a function of latitude, season, and local time.

PAT-APPL-6-086 188 PC **A02**/MF **A01**
Department of the Navy Washington DC
Underwater Audio Intercommunication System.
Patent Application,
Frank R. Abbott. Filed 17 Oct 79, 8p AD-D006 896/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Audio communications between divers or between a diver and a surface craft are made without unduly burdening the divers. Diver carried throat microphones pass vocal signals to a preamplifier-amplifier package. The package drives a transducer which projects amplified vocal signals that are capable of being heard by the other diver or feeds signals to a surface power supply pack and a speaker while a surface microphone enables communications from the surface to the divers. The divers don't carry any additional electronics instrumentations and, since there is no signal heterodyning, distortion is reduced. (Author)

PB80-115207 CP **T07**
Federal Communications Commission, Washington, DC. Data Automation Div.
Common Carrier Individual Land Mobile Data Base.
Data file,
James McCormick, and Lewis Young, Jr. 7 Dec 79, mag tape FCC/DR-79/020
Supersedes rept. no. FCC/DF-79/009, PB-295 326.
Source tape is in EDBCIC character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

The Common Carrier Individual Land Mobile Data Base contains information on all individual land mobile subscribers that are currently licensed. Data base records contain information for: Existing licensees; Licensees marked for deletion; and Transmitter data; The call sign is the major data base identifier.

PB80-126139 PC **A09**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Switch Element Capacities in Access Area Digital Switching Systems,
R. F. Linfield, and M. Nesenbergs. Sep 79, 192p NTIA/REPORT-79/26

The capacity of a digital circuit switching system is defined in terms of its four major elements: the traffic offered by the interface element, the maximum traffic carried by the switch matrix, the maximum number of call attempts handled by the control processor, and the maximum number of calls handled by the signaling elements. These element capacities may be engineered for the expected traffic (e.g., call attempts and holding times), the performance objectives (e.g., blocking probabilities and tolerable delays), the processor capabilities (e.g., speeds, memory sizes, service features), and the signaling techniques (e.g., common channel or per-channel signaling). In a properly engineered system, the interrelations between the capacity of all elements should be considered. This report discusses such interrelationships and characterizes representative switch configurations on the basis of the four major elements.

PB80-130941 PC **A19**/MF **A01**
Mathtech, Inc., Princeton, NJ.
Economic Techniques for Spectrum Management,
Carson E. Agnew, Richard G. Gould, Donald A. Dunn, and Robert D. Stibolt. 20 Dec 79, 450p
Sponsored in part by National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunications Sciences. Prepared in cooperation with Telecommunications Systems, Washington, DC.

Economic marketplace techniques are suggested which would make more efficient use of the radio frequency spectrum than is currently accomplished through complex technical and administrative procedures. Stress is placed on increased reliance on the incentives of individual users and less on the government to determine who will use frequencies. Flexibility of services and speedier licensing would result. Economic techniques included are auctions, frequency coordination, band assignment, and freely transferable licenses. Four case studies include, beyond a general analysis of

spectrum management, (1) use of frequency coordination for fixed and fixed satellite services, (2) auctions for multipoint distribution services (MDS), (3) band assignment for land mobile radio, and (4) possible markets for satellite orbit spectrum.

PB80-132129 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Road Information Transmitted Aurally: Inductive Loop Field Pattern: Measurements on the M4 Motorway,
R. C. Moore, and J. R. Spindlow. c1978, 31p
TRRL-SUPPLEMENTARY-420
Also pub. as ISSN-0305-1315.

The concept of RITA (Road Information Transmitted Aurally) was to communicate spoken messages directly to the driver of a vehicle approaching a traffic incident, and to warn of the danger, delay, and possible re-routing required. Inductive loop communication in the low frequency (16 to 150 kHz) band may be used to transmit such information. The loop may be buried beneath or on the edges of a road, coupling directly with a receiver mounted in the vehicle. To investigate the installation and maintenance problems and to determine the electrical radiation properties of inductive loops, seven buried cable loops were installed in the M4 Motorway between the Theale (No. 12) and Maidenhead (Nos. 8/9) interchanges. The installation was carried out in the summer of 1971 and the motorway opened to traffic in December of the same year. This report describes the techniques used to electrically energize these cable loops, the resultant electromagnetic field patterns so obtained, the signal loss experienced due to bridge structures, the loop attenuation characteristics, and the variations occurring between loops. (Copyright (c) Crown Copyright 1978.)

PB80-134083 CP **T99**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Amateur Master File.
Data file,
W. C. Bushman. Dec 79, mag tape FCC/DF-80/004
Supersedes rept. no. FCC/DF-79/002, PB-292 315.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Amateur Radio Service Data File contains data for applicants and licenses operating under the Amateur Radio Service, and the primary information obtained from FCC Form 610, Application for Individual Amateur Radio Service and/or Operator License, and FCC Form 610B, Application for Amateur Club or Military Recreation Station License. Data records include station and license identification, mailing address (all items do not contain Zip Code), radio frequency, issue and expiration dates, and various codes.

17D. Electromagnetic and Acoustic Countermeasures

AD-B013 005/4 PC **A16**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Advanced Radar Reflector Studies.
Final summary rept. 12 Apr 72-30 Jun 75,
R. J. Garbacz, V. Cable, R. Wickliff, R. Caldecott, and J. Buk. Dec 75, 368p ESL-3401-3, AFAL-TR-75-219
Contract F33615-72-C-1435
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The purpose of this effort was to develop user-oriented computer programs for the investigation of the electromagnetic scattering and extinction characteristics of clouds of linear metallic resonant wires for chaff applications, including the effects of mutual coupling between wires. Programs based upon Crout-like algorithms working on matrices generated by the method of moments were developed to accommodate up to 200 wires; sparse matrix and iterative algorithms were programmed for larger numbers of wires. All programs are documented in this report. Data generated during the course of the effort are also presented in this report, including curves of the reduction (due to coupling) in average scattering cross section as a function of number density of chaff elements. (Author)

AD-B016 657/9 PC **A05**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB Ohio
Receiver Analysis Program.
Interim rept. Oct 74-Nov 75,
J. B. Y. Tsui, S. J. Johnson, and W. T. Brumfield. Dec 76, 77p Rept no. AFAL-TR-76-199
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

There are many approaches to the design of microwave receivers. Each approach will use a large number of components with different specifications. It is necessary for the designer to predict the performance of all the designs in order to optimize the receiver, which is a tedious calculation. This report presents a computer program which will do these calculations. The program is basically self-explanatory, since it is written in an interactive conversational mode for on-line execution via an intercom terminal. Questions and explanatory comments are put to the user during execution, which help to guide him in the use of the program. It can be used either through an intercom or batch terminal. The program uses the specification of the receiver components as input, i.e., gain, noise figure, intermod point, etc. The output of the program will not only generate the important characteristics of the receiver, such as sensitivity, dynamic range, and spurious product, but also indicate the elements that limit the performance, by generating the percentage of contribution by each component. One can also easily add a new component to a receiver, eliminate an old one or change the specifications of a component. In case one intends to cover a wider instantaneous bandwidth, for example, in channelized receivers with less hardware, a fold mode can be used. This program can handle the noise figure of the fold mode, provided that the different front ends of the receiver have the same noise figure. (Author)

17E. Infrared and Ultraviolet Detection

AD-A079 574/0 PC **A03**/MF **A01**
Institute for Defense Analyses Arlington VA Science and Technology Div
Effect of Weather at Hannover, Federal Republic of Germany, on Performance of Electrooptical Imaging Systems. Part 3. Uncertainties in Comparison of FLIR Performance in the 3-5 and 8-12 micrometer Bands.
Final rept.,
Lucien M. Biberman. Sep 79, 35p IDA-P-1128, IDA/HQ-75-17589, AD-E500 110
Contract MDA903-79-C-0202
See also Part 2, AD-C010 255.

This paper addresses aerosol contributions to the atmospheric problem, the uncertainties in predicting electrooptical system performance through the atmosphere in both the 3-5 and 8-12 micrometer bands because of uncertainties about aerosol composition and size distribution, and the effects of both aerosol composition and size distribution. (Author)

AD-A079 957/7 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
Radiometric Measurements Using Line Scanned Infrared Imaging Systems.
Technical rept.,
G. V. Poropat. Aug 79, 23p Rept no. ERL-0099-TR

The use of line scanned imaging systems in performing radiometric measurements enables the collection of considerable amounts of data which may be used in determining the distribution of radiant energy from a source. The interpretation of this data may be subject to errors due to the detector field of view and the scanning process. The sources of these errors and their magnitude are considered and guidelines for the analysis of the data developed. (Author)

AD-B013 689/5 PC **A02**/MF **A01**
Naval Weapons Support Center Crane Ind
Photometric and Near Infrared Radiometric Measurement Systems.
Final rept. 30 Sep 74-30 Jun 76,
Forrest L. Burton, and Carl E. Dinerman. 30 Aug 76, 13p Rept no. NWSC/CR/RDTR-34
Distribution limitation now removed.

This report describes the details of calibration, operation, and constraints of a photometric and a 0.73-0.97 micrometers near infrared radiometric measurement system, both constructed at NAVWPNSUPPCEN Crane for measurements of flare plume candlepower and radiant intensities, respectively. (Author)

AD-B013 900/6 PC **A08**/MF **A01**
Ford Motor CO Dearborn Mich Research Staff
Development of High-Speed IV-VI Photodiodes.
Final rept. Jan 75-Mar 76,
H. Holloway, M. D. Hurley, E. B. Schermer, and K. F. Yeung. Jun 76, 168p
Contract DAAK02-75-C-0106
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The studies that are described were aimed at reduction of the capacitance of IV-VI semiconductor photodiodes, with particular emphasis upon 3-5 micrometer devices that are suitable for lightweight thermal imaging systems. The starting point was the thin-film Pb barrier IV-VI photodiodes that were discovered and developed by Ford Research Staff.

AD-B028 668/2 PC **A04**/MF **A01**
Naval Weapons Center China Lake Calif
Application of Statistical Fracture Criteria to the Problem of Predicting Infrared Dome Thermal Shock Failures.
Study of fracture theories FY 1975-FY 1977,
W. R. Compton. Jan 78, 68p NWC-TP-6010, GIDEP-E111-1461
Distribution limitation now removed.

Two statistical fracture theories are applied to the problem of infrared dome fracture in an aerodynamic heating environment. Theoretical fracture predictions are compared with fracture data obtained from full-scale infrared domes in aerodynamic heating and radiant heating tests. A sample application of a fracture theory in the definition of missile launch envelope restrictions is presented for magnesium fluoride domes. (Author)

17G. Navigation and Guidance

AD-A079 543/5 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA
Combined Pseudo Range and Doppler Positioning for the Stationary Navstar User.
Final rept.,
Paul S. Jorgensen. 20 Mar 79, 46p TR-0079(4475-01)-3, SAMSO-TR-79-79
Contract F04701-78-C-0079

An early success in testing Navstar user equipment was achieved with the Manpack receiver. Using only two satellites, Navstars 1 and 2, the receiver accurately performed two-dimensional positioning while stationary. It was, in effect, combining pseudo range and integrated Doppler data. This concept of combining both types of data can be extended to three dimensions and to the operational Phase III Navstar. The stationary user can accomplish three-dimensional navigation with only three satellites. This capability is of interest to the Army since it would permit the stationary use of Navstar with much greater elevation mask angles. With the baseline 24-satellite constellation, three-dimensional navigation can be accomplished with a 30-deg mask angle, but it will take a few minutes longer because of the extra time required for making integrated Doppler measurements. Using this technique, three-dimensional position will be obtained to within 16 meters about 90 percent of the time. This operational capability will enhance the Army's ability to use Navstar in the presence of jamming, foliage, and terrain. (Author)

AD-A079 564/1 PC **A02**/MF **A01**
Air Force Packaging Evaluation Agency Wright-Patterson AFB OH

Packaging and Shipping Analysis of the ASN-129 AHRS Displacement Gyro,
Frank C. Jarvis. 29 Nov 79, 10p Rept no. PTPT-79-18

The packaging and shipping analysis of the ASN-129 AHRS Displacement Gyro (A-10 aircraft) revealed that the Transportation Packaging Order pack (TPO 01-021-3681) will not provide the 15 to 20 G shock protection level recommended for this gyro. Field tests confirmed the results of the in-house study. (Author)

AD-A079 663/1 PC **A14**/MF **A01**
Westinghouse Electric Corp Baltimore MD
Far Field Monitor for Instrument Landing Systems.
Interim rept. on Phases 1 and 2,
R. More, J. C. Bradley, and B. Newman. Nov 79, 317p FAA-RD-79-70
Contract DOT-FA75WA-3689

This report describes a study performed to determine the nature of scattering of ILS radiated signals by objects on the airport property. These included both taxiing and overflying aircraft. The interaction of this scattered energy with the direct radiation was studied to determine the derogating effects of ILS guidance. This resulted in the development of four system level concepts for detecting glide path derogation. One technique, the Vector DDM, was selected as being most practical from a sensitivity, reliability, and cost point-of-view. (Author)

AD-A079 776/1 PC **A04**/MF **A01**
Army Communications-Electronics Engineering Installation Agency Fort Huachuca AZ
Standard Engineering Installation Package AN/TSQ-117, Aircraft Control Central.
Final rept.
31 Oct 79, 71p Rept no. USACEEIA-SEIP-027

This standard engineering installation package assists project officers, logisticians, engineers, and technicians to program, procure, engineer, and install the AN/TSQ-117. Document provides a system description with prerequisites that are essential for effective implementation of the AN/TSQ-117. Document also provides the necessary drawings, bill of materials, and quality assurance. (Author)

AD-A079 910/6 PC **A06**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communication Initial Evaluation Report, Tyndall AFB, Florida, 4-17 September 1979.
Final rept.,
Paul F. Finkes, Jr. 10 Dec 79, 106p Rept no. 79/66C-185

A Communications Initial Evaluation was performed at Tyndall AFB, Florida from 4-17 September 1979. The purpose of the evaluation was to define the capabilities and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

AD-A079 913/0 MF **A01**
Facility Checking Squadron (1866th) (Afcs) Scott AFB IL
TRACALS Evaluation Report. Communication Initial Evaluation Report, Spangdahlem AB, Germany, 12-25 July 1979.
Final rept.,
John D. Collier. 30 Nov 79, 119p Rept no. 79/66C-179
Availability: Microfiche copies only.

A Communications Initial Evaluation was performed at Spangdahlem AB, Germany from 12 to 25 July 1979. The purpose of the evaluation was to define the capabilities and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

AD-A079 921/3 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (Afcs) Scott AFB IL
TRACALS Evaluation Report. Special Evaluation Report, ATCRBS Five Foot Planar Array Antenna, Sheppard AFB, Texas. 2-7 November 1979.
Final rept.,
Earl T. Pinney, Jr. 14 Dec 79, 35p Rept no. 79/66S-193

This report presents data collected from 2-7 November 1979, to define the capabilities and limitations of the five foot Planar Array Antenna. This report includes descriptions of the usable ATCRBS coverage and tracking capabilities, analysis of all flight and equipment performance data, the performance predictions for the system, and compares the present false targets to those reported using the AT-914 ATCRBS antenna. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-B006 597/9 PC **A04**/MF **A01**
Air Force Special Weapons Center Kirtland AFB N Mex
Two-Axis Angular Rate and Acceleration Multisensor Test.
Final rept. Nov 73-Jun 75,
Craig H. Price, Richard E. Rumph, and Robert R. Thede. Aug 75, 59p Rept no. AFSWC-TR-75-53
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

Two Litton MS-4 Multisensors, S/N 17 and S/N 23 were tested at the Central Inertial Guidance Test Facility, 6585th Test Group, Holloman AFB, New Mexico during the period from November 1973 to June 1975. The purpose of the tests was to collect performance and environmental data on the instruments. The laboratory tests included gyro and accelerometer coefficient determination; drift tests; voltage, frequency and temperature sensitivity tests; and scale factor linearity tests. A hot soak was the only environmental test performed due to failure of one instrument and damage to the other. The report contains test results for the complete laboratory phase of testing on Multisensor S/N 17 and results of coefficient determination and drift tests on Multisensor S/N 23. (Author)

AD-B024 885/6 PC **A03**/MF **A01**
Naval Weapons Center China Lake Calif
A Method for Estimating Target Acceleration and Its Use in a Missile Guidance Law.
Interim study rept. Jun-Aug 76,
Richard A. Bednar. Nov 77, 48p Rept no. NWC-TP-5913
Distribution limitation now removed.

This report describes an algorithm for estimating target velocity and acceleration using radar and inertial sensor measurements as inputs. In order to determine the accuracy and benefits of such an estimator, the algorithm is incorporated into a missile guidance law. Through the use of a simulation, terminal miss distances are compared with a similar missile using proportional navigation. Simulation results indicate a reduction in miss distance when such an estimate is used because of the missile's ability to recognize and compensate more quickly for the target maneuver. (Author)

AD-B027 772/3 PC **A12**/MF **A01**
Logicon Inc San Pedro Calif
Guidance/Navigation Requirements Study Final Report. Volume III. Appendices.
Rept. for 15 May 75-30 Apr 78,
S. M. Archer, C. L. Bowman, Eugene F. Nicholson, D. D. Sworder, and S. B. Vidor. 30 Apr 78, 252p SAMSO-TR-78-92-VOL-3
Contract F04701-75-C-0112
See also Volume 1, AD-C014 458L.
Distribution limitation now removed.

Contents: (A) IMU performance Modeling and Evaluation; (B) Calibration and Alignment Performance Evaluation Techniques; (C) System Performance Evaluation; (D) Linear Regulator Guidance; (E) Additional Steering Law Topics; (F) Flight Test Trajectory Design by Simplicial Pivoting; and (G) Free-Flight Filtering.

N80-16051/8 PC **A02**/MF **A01**
Ohio Univ., Athens. Avionics Engineering Center.
Results of a LORAN-C Flight Test Using an Absolute Data Reference.
J. P. Fischer. Jan 80, 22p NASA-CR-162751, TM-74
Contract NGR-36-009-017

A closed circuit flight test was conducted in the Boston area using VOR's and NDB's as reference points. The Loran-C data collected during the flight was then compared against a reference provided by the Discrete Address Beacon System (DABS) facility at Lincoln Laboratories. A MIT crew used a commercial receiver and recorded Loran-C time differences which would also be compared with the data provided by the DABS facility and eventually with the data collected by Ohio University. The Ohio University low-cost receiver was used for this test which was conducted in the Ohio University DC-3 flying laboratory. The Loran-C time-difference data was recorded with a microcomputer data collection system and stored on magnetic tape for subsequent analysis. The MIT receiver was also on board the DC-3, and recorded its data on a cassette tape which was later used by the MIT crew for data analysis. The equipment configuration in the aircraft, the flight procedure and the results obtained from the data collected with Ohio University's receiver and recording system are described.

PAT-APPL-6-064 688 PC **A02**/MF **A01**
Department of the Navy Washington DC
A Terrain Correlation Updating System.
Patent Application,
Thomas S. Herm. Filed 3 Aug 79, 23p AD-D006 814/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a terrain correlation updating system for determining navigation updates for an inertial navigation system operating at low altitudes or on board a terrain following vehicle. The inertial navigation system provides data for flight path control during the fixtaking process, and provides lateral longitudinal and vertical position data used in the correlation process. Measured inertial altitude and Coriolis correction factors together with a barometric altitude are input to a baro-damped inertial loop to produce an averaged corrected inertial altitude for a given reference map cell size. The average radar altitude for each cell is subtracted from the corrected inertial altitude to give a terrain altitude estimate. The terrain altitude samples are normalized and stored until the completion of the flight path. At the conclusion of sampling, a correlation algorithm compares the sampled normalized terrain altitudes with the reference map normalized altitudes. This process is repeated for a plurality of reference maps which may overlap. At the completion of the sampling and correlation phase, the fixes from each map are input to a majority voting logic to determine optimal estimates of true position. These data are input to a delayed-observable Kalman filter which generates the error correction signals to update the inertial navigation system. (Author)

PB80-129323 PC **A16**/MF **A01**
National Telecommunications and Information Administration, Annapolis, MD.
Spectrum Resource Assessment in the 2.7-2.9 GHz Band Phase II: Radar Signal Processing.
Rept. no. 2,
Robert L. Hinkle, Robert M. Pratt, and Jay S. Levy. Aug 79, 363p NTIA/REPORT-79/25
See also report no 1, dated Aug 76, PB-258 511.

A detailed program was performed to investigate the signal processing properties of the primary radars in the 2.7 to 2.9 GHz band, and the Automated Radar Terminal System (ARTS-IIIA) post

processor planned for use by the Federal Aviation Administration on the Airport Surveillance Radars (ASRs). This investigation was the second investigation in a series of tasks undertaken by NTIA as part of a spectrum resource assessment of the 2.7 to 2.9 GHz band. The overall objective of the spectrum resource assessment was to assess the degree of congestion in the band in designated areas in the United States, and to promote more effective utilization of the band. It was concluded that some spectrum conservation techniques can be used by the radiodetermination services in the 2.7 to 2.9 GHz band to obtain more efficient utilization of the spectrum. Also, the current hardware in the later model primary radars and the ARTS-IIIA will suppress asynchronous interference with trade-offs to the desired signal performance.

17H. Optical Detection

AD-A079 540/1 PC **A06**/MF **A01**
Hughes Aircraft Co Culver City CA
Position and Attitude Monitor (PAM).
Final technical rept.,
L. Hill, W. Buchman, J. Wagner, and R. Julian. Aug 79, 103p HAC-FR-79-73-801R, HAC-REF-02493, DELNV-TR-75-0810-F
Contract DAAB07-75-C-0810

The exploratory development model of the Position and Attitude Monitor, PAM, represents the current state of the art in electrooptical remote attitude measurement. The basic operation of the PAM depends on a laser illuminating retroreflective optics of the airborne component from a tracking ground station. The application for which the PAM was developed is an Airborne Passive Artillery Locating System (PALS-A). PAM design details, test techniques, and pre-acceptance test results are presented. Formal acceptance testing was completed after delivery to Ft. Monmouth. Position measurement accuracy of the exploratory development model of the PAM was demonstrated to be 0.1 meter. Attitude measurement capability was demonstrated to on the order of 0.2 milliradian. The operational range of the PAM was demonstrated to 450 meters. All testing was done on the ground using a horizontal simulated flight profile. Test results validate PAM design concepts and indicate further development is warranted. This electro-optical, three-axis, remote attitude measuring technique appears to be useful to distances of a kilometer or more.

PAT-APPL-6-072 820 PC **A02**/MF **A01**
Department of the Navy Washington DC
Frustrated Total Internal Reflection Fiber-Optic Small-Motion Sensor for Hydrophone Use.
Patent Application,
Claude E. Manley, James P. Hersey, John H. Pennella, Donald J. Deaton, and Alan L. Crandall. Filed 4 Sep 79, 10p AD-D006 815/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus for sensing motion relies upon the total light transmitted by an optical fiber. The fiber is wound in a coil and cemented to a rigid base and a portion of the fiber's cladding is removed exposing its core. A highly refractive plate is placed closely adjacent the exposed core. When the plate is displaced, it intercepts at least a portion of the evanescent field that is adjacent to the core. The intercepted portion reduces the total amount of light otherwise projected through the coiled optic fiber so that a detector can provide representations of the amplitude and frequency of the plate motion. The plate only penetrates the fiber's evanescent optical field which is associated with the total internal reflection at the glass-to-air interface at the fiber's surface. Adjusting devices and pressure compensation optionally are employed making this device suitable for use has a hydrophone. (Author)

PATENT-4 181 435 Not available NTIS
Department of the Air Force Washington DC
Holographic Field Lens Detector.
Patent,
Tommy L. Williamson, and Harold W. Rose. Filed 29 Jun 73, patented 1 Jan 80, 6p AD-D006 833/8, PAT-APPL-373 527
Supersedes PAT-APPL-373 527-73.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a holographic field lens detector system having an objective lens for focusing incoming light from a distant illuminating source upon a holographic lens positioned at the back focal plane of the objective lens. The aperture of the objective lens is simultaneously imaged on four detectors positioned in back of the holographic lens and on the four sides of holographic lens. The output of opposite pairs of detectors are fed to sum and difference circuits with the output of the sum and difference circuits being supplied to divide circuits to provide X and Y position information for the illumination on the holographic lens. (Author)

PATENT-4 185 919 Not available NTIS
Department of the Air Force Washington DC
Quadrant Detection System.
Patent,
Tommy L. Williamson, and Harold W. Rose. Filed 8 Jun 73, patented 29 Jan 80, 3p AD-D006 852/8, PAT-APPL-369 030
Supersedes PAT-APPL-369 030-73.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a quadrant detection system having an objective lens and a holographic lens positioned at the back focal plane of the objective lens. Four photoelectric detectors are positioned on the side of the holographic lens remote from the objective lens. The holographic lens has lens elements in four quadrants with each quadrant having a focal point corresponding to the position of the photoelectric detectors. (Author)

17I. Radar Detection

AD-A079 620/1 PC **A08**/MF **A01**
Harry Diamond Labs Adelphi MD
Near-Millimeter Wave Technology Base Study: Volume I. Propagation and Target/Background Characteristics.
Special rept.,
Stanley M. Kulpa, and Edward A. Brown. Nov 79, 170p Rept no. HDL-SR-79-8-VOL-1

This study is a comprehensive summary of the Near-Millimeter Wave (100 to 1000 GHz) technology base and its potential applications. The state of the art is reviewed, and technology gaps are identified. Volume I contains the results of that portion of the Study devoted to the analysis of various factors influencing atmospheric propagation and target/background signatures. Comparison is made between theoretical predictions and limited experimental data in several key areas. Topics discussed include clear air absorption, the effects of atmospheric particulates (rain, fog, clouds, etc.) turbulence, measurement techniques, and the signature characteristics of a variety of targets and backgrounds at near-millimeter (NMM) wavelengths. A summary is given of research thrusts which would be useful in establishing a more reliable data base for evaluating near-millimeter wave systems applications. Also included is a list of facilities and organizations actively involved in this technology, plus a comprehensive reference list of current and historical literature pertinent to the material in this volume. (Author)

AD-A079 655/7 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Characterization of Nonstationary Clutter.
Phase rept. 15 Jun-30 Sep 78,
Donald J. Lewinski. Nov 79, 44p RADC-TR-79-267
Contract F30602-78-C-0120

A mathematical model for nonstationary and/or nonhomogeneous clutter is proposed and developed. The first order probability density function of the clutter power is treated as the expected value of a conditional density which is a function of random parameters. General expressions are derived and selected plots are given for Nakagami conditional density functions with mean values which have the following distributions: uniform, gamma, log uniform and log normal. It is seen that the limiting behavior of all the considered cases is similar. (Author)

AD-A079 678/9 MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
A Standardization Evaluation Potential Study of the Common Multi-Mode Radar Program.
Final rept. Jan-Sep 79,
J. Gregory Jolda, and Janine L. Thomas. Nov 79, 194p Rept no. AFAL-TR-79-1195
Availability: Microfiche copies only.

The cost impact of standardization as applied to Air Force avionic systems is discussed in this report. Several life-cycle cost estimates were made on the ASD Common Multi-Mode Radar program using the Standardization Evaluation Program (STEP) model. Costs for development, operation, and support of a common (standard) radar system are compared with like costs estimated for using individually developed radar systems across applicable aircraft. The STEP model is described, the Common Multi-Mode Radar program is discussed, and the STEP model application to this radar program is documented. STEP estimates project life-cycle costs of unique radar systems to be twice those of a common radar system. Results are discussed in terms of STEP runs and ASD costing estimates, and STEP model use is described. (Author)

AD-A079 754/8 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
An Evaluation of ERIM X-L Band Airborne Synthetic Aperture Radar Imagery of Sea Ice.
Final rept.,
R. D. Ketchum, Jr. Jul 78, 26p Rept no. NORDA-TN-28

Results of an evaluation of the ERIM X-L band airborne synthetic aperture radar imagery of sea ice in the Labrador Sea are given. Incident sea and swell and surface winds in this area produce complex and chaotic ice conditions with very rough surfaced ice breccias being the dominant form. It was possible to extract more information concerning the ice conditions when using both radar frequencies and polarizations. Surface roughness differences and distribution were more accurately determined using the X-band radar imagery. Variations in the nature of the surface roughness are sometimes evident due to their varying polarizing effect on the X-band radar. Floe distribution is better displayed by the L-band radar imagery, but only minor differences were recorded by the two L-band radar polarizations. The analysis shows that the X-band radar is more sensitive to ice surface properties, but that surface penetration and subsurface interfaces may account for much of the L-band radar backscatter. There are some indications of X-band subsurface return and depolarization in some very early stages of ice development. This suggests that sea ice crystal structure, size, and orientation in these early stages of ice development may be important contributors to the backscatter and polarization effects on radar energy which has penetrated the surface. (Author)

AD-B009 060/5 PC **A02**/MF **A01**
Naval Research Lab Washington D C
Radar Cross Sections of the T-38 Aircraft for the Head-on Aspects in L, S, and X Bands.
Final rept.,
F. D. Queen. 8 Jan 76, 18p Rept no. NRL-7951
Distribution limitation now removed.

The radar cross sections of a T-38 aircraft were determined for nose-on aspects using the NRL dynamic area measurement system. The 20, 50, and 80 percentile values of the radar cross section distribution function were tabulated. Left-circular polarization was transmitted at 9225 MHz, and the parallel and orthogonal components were received. Vertical polarization was used on transmission and reception for 2800 MHz and 1300 MHz. The RCS for the nose-on asepect can vary as much as 3 dB between runs, because the aircraft rarely holds a constant aspect with respect to the radar from run to run, or during a run. When the aspect cell size is limited to + or - 1.0 degree, the median radar cross sections are shown to be 0.8

sqm for the X-band left-circular return, 3.1 sqm for 2800 MHz, and 1.8 sqm for 1300 MHz.

AD-B012 103/8 PC **A06**/MF **A01**
Ballistic Research Labs Aberdeen Proving Ground MD
Millimeter Wave Radar Applications to Weapons Systems.
Final rept.,
Victor W. Richard. Jun 76, 118p Rept no. BRL-MR-2631
Supersedes rept. no. BRL-IMR-61.
Distribution limitation now removed.

Applications of millimeter wave radars in ground-to-air, ground-to-ground, and air-to-ground weapons systems are presented. The advantages and limitations of operating at millimeter wavelengths are defined. The characteristics of millimeter wave propagation in adverse weather are described with emphasis on rain backscatter and attenuation theory, experimental data, and rain effects on radar system performance. The theory of fluctuating clutter is discussed and a terrain clutter model is presented whose output is characterized by its power spectral density and probability density function. Several clutter discrimination techniques are described. The status of millimeter wave radars and components is reviewed and technology advances required are pointed out. (Author)

AD-B023 405/4 PC **A11**/MF **A01**
Boeing CO Wichita Kans Wichita Div
Electronically Agile Radar (EAR) Interface Investigations.
Final technical rept. Jan-Jul 76,
Martin Thornburg, Memphis Hixon, Everett W. Scovel, Don Hutchison, and Waller Newby. Apr 77, 228p AFAL-TR-76-231
Contract F33615-76-C-1145
Distribution limitation now removed.

A flight test interface for the Electronically Agile Radar (EAR) in a model B-52G strategic weapon system test bed is defined. Space provisions were developed considering flight test requirements and, for the nose radome area only, the requirements of B-52 defensive subsystems. The Ear and instrumentation require added B-52 environmental control system capability. An analysis of radome characteristics indicates beam deflection compensation requirements are reasonably continuous and change little with frequency excursions. Most of the bombing-navigation system will be removed to make room for the EAR, but a doppler-inertial navigation capability independent of the EAR Test Article will be retained. Flight test planning includes delineation of the radar contractor and test bed contractor responsibilities for materials and services. (Author)

AD-B025 447/4 PC **A04**/MF **A01**
Sri International Menlo Park Ca
Technical Support for the CONUS OTH-B Experimental Radar System.
Semiannual technical rept. no. 13, 1 Jan-30 Jun 77,
Walter B. Zavoli, Philip C. Evans, Taylor W. Washburn, and Charles A. Cole. Dec 77, 63p
Contract N00014-75-C-0930, Grant ARPA Order-1656
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

This report describes major aspects of the technical support provided by SRI International (formerly Stanford Research Institute) to the Electronic Systems Division (ESD), AFSC, in the development of the CONUS 414L Experimental Radar System (ERS). Areas of investigation covered in detail include propagation management and out-of-beam energy rejection. Discussed also are technical studies initiated in direct response to immediate Air Force interests. In achieving and confirming the findings, extensive use was made of the Wide Aperture Research Facility (WARF) and its existing over-the-horizon backscatter (OTH-B) HF radar. WARF is an SRI-operated, ESD/ONR-sponsored facility capable of simulating ESD's ERS operations in almost all respects, although on a smaller operating scale. (Author)

AD-B025 970/5 PC **A11**/MF **A01**
Harris Corp Melbourne Fla Electronic Systems Div
Monopulse Tracking with Adaptive Arrays.
Final technical rept. 14 Jun 76-14 Jun 77,
George G. Rassweiler, Eduardo H. Villaseca, Samuel L. Earp, Carl E. Giesler, and Charles L. Zahm. Jan 78, 246p RADC-TR-78-14
Contract F30602-76-C-0292
Distribution limitation now removed.

This technical report assesses the effectiveness of monopulse tracking while cancelling jammers in the sidelobes using practical null steering techniques. In monopulse tracking systems using adaptive arrays, two adaptive receiving beams with nulls on the sidelobe jammers are formed: a sum beam sigma and a difference beam delta. In this report, antenna pattern decomposition of the sum and difference beams allows first-order estimates of the boresight shift error due to null steering when the jammer locations and the adaptive weights are known. Measurements on a small fully adaptive amplitude comparison monopulse array are presented and compared with computer simulations including both random construction errors and null steering errors. Computer simulation results are also presented for larger arrays. In most cases, random construction errors in the monopulse tracking array cause more monopulse boresight shift error than will be caused by optimal null steering of the sidelobes. (Author)

N80-16263/9 PC **A02**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Weighting in Digital Synthetic Aperture Radar Processing.
A. Dicenzo. 15 Nov 79, 25p NASA-CR-162684, JPL-PUB-79-94
Contract NAS7-100

Weighting is employed in synthetic aperture radar (SAR) processing to reduce the sidelobe response at the expense of peak center response height and mainlobe resolution. The weighting effectiveness in digital processing depends not only on the choice of weighting function, but on the fineness of sampling and quantization, on the time bandwidth product, on the quadratic phase error, and on the azimuth antenna pattern. The results of simulations conducted to uncover the effect of these parameters on azimuth weighting effectiveness are presented. In particular, it is shown that multilook capabilities of future SAR systems may obviate the need for consideration of the antenna pattern, and that azimuth time-bandwidth products of over 200 are probably required before the digital results begin to approach the ideal results.

N80-16264/7 PC **A03**/MF **A01**
Computer Sciences Corp., Silver Spring, MD. Systems Sciences Div.
A Survey of Airborne Radar Systems for Deployment on a High Altitude Powered Platform (HAPP).
Final Report.
B. J. Choudhury, and K. C. Leung. Oct 79, 39p NASA-CR-156860, CSC/TM-79/6294
Contract NAS6-6569

A survey was conducted to find out the system characteristics of commercially available and unclassified military radars suitable for deployment on a stationary platform. A total of ten domestic and eight foreign manufacturers of the radar systems were identified. Questionnaires were sent to manufacturers requesting information concerning the system characteristics: frequency, power used, weight, volume, power radiated, antenna pattern, resolution, display capabilities, pulse repetition frequency, and sensitivity. A literature search was also made to gather the system characteristics information. Results of the survey are documented and comparisons are made among available radar systems.

PATENT-4 176 354 Not available NTIS
Department of the Navy Washington DC
Phased-Array Maintenance-Monitoring System.
Patent,
James K. Hsiao, and J. Paul Shelton. Filed 25 Aug 78, patented 27 Nov 79, 6p AD-D006 871/8, PAT-APPL-937 310
Supersedes PAT-APPL-937 310-78, AD-D005 335.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a system and method for monitoring the operability of a radar system having a phased-array antenna system. During an initial radiation pattern, a portion of the signals radiated from each radiating element of the array (except, in general, a center element, if any) is fed to a manifold network which combines the signals received from radiating elements which are symmetrically located with respect to the center of the array so that they differ by 180 deg at the single manifold output. Radio-frequency energy is added to the manifold output to adjust it to approximately zero. While the radio-frequency energy added to the manifold network is maintained at this value, the phase-shift settings of pairs of radiating elements having equal amplitude-weighting are varied from the initial setting through 360 deg. Failures are located by correlating the phase-shift settings and the adjusted output of the manifold network. (Author)

17J. Seismic Detection

AD-A079 572/4 PC **A02**/MF **A01**
California Inst of Tech Pasadena Seismological Lab
Time Functions Appropriate for Nuclear Explosions,
Larry J. Burdick, and D. V. Helmberger. 29 Sep 78, 19p AFOSR-TR-79-1289
Contract F49620-77-C-0022
Pub. in Bulletin of the Seismological Society of America, v69 n4 p957-973 Aug 79.

No abstract available.

AD-A079 615/1 PC **A05**/MF **A01**
Sierra Geophysics Inc Arcadia CA
Seismic Waveform Analysis of Underground Nuclear Explosions.
Annual technical rept.,
R. Butler, L. J. Ruff, R. S. Hart, and G. R. Mellman. 15 Nov 79, 81p SGI-R-79-011, AFOSR-TR-79-1318
Contract F49620-79-C-0012, DARPA Order-3291

The present research program represents an application of the methods of time domain seismology to the observed short period P-waves from underground explosions. The goals were to obtain better estimates of the variation of short period seismic attenuation across the continental United States, evaluate the influence of different source regions on teleseismic P-wave amplitudes and waveforms, quantify the concepts of station/receiver transparency, and develop the initial states of a waveform inversion technique for both source discrimination and source description applications. A significant portion of the work performed on the first and second parts of this task was reported in the Sierra Geophysics Quarterly Technical Reports SGI-R-79-001 and SGI-R-79-004. That research is summarized and some additional work and insights into the implications of the results are included. The last section contains discussions of station transparencies and progress report on waveform inversion techniques.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

PAT-APPL-6-024 135 PC **A02**/MF **A01**
Department of the Navy Washington DC
Neutral-Beam-Sustained Astron Reactor.
Patent Application,
Kwo Ray Chu, and Christos A. Kapetanakos. Filed 26 Mar 79, 11p AD-D006 807/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The disclosure is directed to a method and device for containing a high temperature plasma and generating neutrons. A tritium plasma is confined in a closed magnetic field configuration produced by the combination of an externally applied magnetic

field and the self magnetic field of a fast rotating deuterium ion layer and heated by coulomb collisions within the deuterium ion layer. The system is maintained at a steady state by the continuous injection of energetic neutral deuterium beams of energy from 50-300 keV. The neutral deuterium beam penetrates freely through the vacuum magnetic field and, upon ionization in the plasma region, forms an ion layer. The use of neutral beams to sustain a closed magnetic field configuration for plasma confinement and thereby achieve continuous operation is an important feature of the present invention. (Author)

18D. Nuclear Instrumentation

PATENT-4 150 290

Not available NTIS

Department of Energy, Washington, DC.
Focal-Surface Detector for Heavy Ions.
Patent,
J. R. Erskine, T. H. Braid, and J. C. Stoltzfus.
Filed 13 May 77, patented 17 Apr 79, 12p PAT-APPL-796 626
Supersedes PAT-APPL-796 626-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A detector of the properties of individual charged particles in a beam includes a gridded ionization chamber, a cathode, a plurality of resistive-wire proportional counters, a plurality of anode sections, and means for controlling the composition and pressure of gas in the chamber. Signals generated in response to the passage of charged particles can be processed to identify the energy of the particles, their loss of energy per unit distance in an absorber, and their angle of incidence. In conjunction with a magnetic spectrograph, the signals can be used to identify particles and their state of charge. The detector is especially useful for analyzing beams of heavy ions, defined as ions of atomic mass greater than 10 atomic mass units. 7 claims. (ERA citation 05:010483)

PATENT-4 157 473

Not available NTIS

Department of Energy, Washington, DC.
Simplified Fast Neutron Dosimeter.
Patent,
M. Sohrabi. Filed 8 Dec 75, patented 5 Jun 79, 8p PAT-APPL-638 899
Supersedes PAT-APPL-638 899-75.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Direct fast-neutron-induced recoil and alpha particle tracks in polycarbonate films may be enlarged for direct visual observation and automated counting procedures employing electrochemical etching techniques. Electrochemical etching is, for example, carried out in a 28% KOH solution at room temperature by applying a 2000 V peak-to-peak voltage at 1 kHz frequency. Such recoil particle amplification can be used for the detection of wide neutron dose ranges from 1 mrad to 1000 rads or higher, if desired. 5 claims. (ERA citation 05:010480)

PATENT-4 157 559

Not available NTIS

Department of Energy, Washington, DC.
Coaxial Nuclear Radiation Detector with Deep Junction and Radial Field Gradient.
Patent,
R. N. Hall. Filed 31 Jan 77, patented 5 Jun 79, 8p PAT-APPL-763 836
Supersedes PAT-APPL-763 836-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Germanium radiation detectors are manufactured by diffusion lithium into high purity p-type germanium. The diffusion is most readily accomplished from a lithium-lead-bismuth alloy at approximately 430 exp 0 and is monitored by a quartz half cell containing a standard composition of this alloy. Detectors having n-type cores may be constructed by converting high purity p-type germanium to n-type by a lithium diffusion and subsequently diffusing some of the lithium back out through the surface to create a deep p-n junction. Coaxial germanium detectors comprising deep p-n junctions are produced by the lithium diffusion process. (ERA citation 05:010477)

PB80-134893 Not available NTIS

National Bureau of Standards, Washington, DC.
A Catalogue of Artifacts Observed in Energy-Dispersive X-Ray Spectrometry and Their Influence on Analysis.
Final rept.,
C. E. Fiori, R. L. Myklebust, and D. E. Newbury. 1979, 38p
Pub. in Paper in Microbeam Analysis in Biology, p225-263 1979.

Spectra recorded with the lithium-drifted silicon detector, a type of energy dispersive x-ray spectrometer frequently used in electron beam instruments, are subject to artifacts introduced during the processes of x-ray detection and signal amplification. The artifacts observed include x-ray absorption effects in the components of the spectrometer and accompanying fluorescence of the silicon of the detector, peak broadening, peak distortion, formation of parasitic peaks caused by escape of silicon x-rays from the detector, sum peaks due to pulse coincidence, and effects due to system deadtime. Other artifacts arise from interactions of the spectrometer with its environment, including microphonic effects and sensitivity to stray sources of radiation in the sample chamber. The artifacts influence the strategy for qualitative and quantitative analysis. Qualitative analysis proceeds through the identification of all members of the family of x-ray lines for each element. Artifacts in spectra are recognized by their particular characteristics and eliminated from consideration as possible elemental constituents of the sample. In quantitative analysis, peak overlaps resulting from broadening can be calculated with algorithms based on the Gaussian function which describes each peak. Peak distortions and silicon escape peaks can also be calculated with appropriate algorithms.

18E. Nuclear Power Plants

PB80-912800 Subscription

Nuclear Regulatory Commission, Washington, DC.
Construction Status Report, Nuclear Power Plants.
1980, 3 issues
Paper copy available on subscription, North American Continent price $36.00/year; single copy price PC$12.50; all others write for quote.

This report is compiled by the Nuclear Regulatory Commission's Office of Management and Program Analysis to provide the information necessary for monitoring progress of the 95 plants under authorized construction in Regions I-V. The report includes data from utilities sponsoring the construction, as well as from NRC's Office of Inspection and Enforcement. This data is used to synchronize the licensing process with predicted fuel load dates for this central Federal Government presentation of commercial reactor construction.

PB80-912900 Subscription

Nuclear Regulatory Commission, Washington, DC.
Operating Units Status Report - Licensed Operating Reactors.
Monthly repts.
1980, 12 issues
Paper copy available on subscription, North American Continent price $120.00/year; single copy price PC$12.50; all others write for quote.

This report is divided into three sections: the first contains monthly highlights and statistics for commercial operating units, and errata from previously reported data; the second is a compilation of detailed information on each unit, provided by NRC Regional Offices and IE Headquarters; and the third section is an appendix containing nuclear availability and capacity factors, forced outage rate statistics, spent fuel storage capability, reactor-years of experience and non-power reactors in the United States. Throughout the report, statistical factors for periods greater than a report month, or for more than one unit, are computed as the arithmetic average of each unit's individual operating statistics. The statistical factors for each unit for the report month are computed from actual power production for the month. The factors for the lifespan of each unit (the 'Cumulative' column) are reported by the utility and are not entirely re-computed by NRC. Utility power production data is checked for consistency with previously submitted statistics.

18F. Radiation Shielding and Protection

NUREG/CR-1263 PC **A16**/MF **A01**

Federal-State Reports, Inc., Falls Church, VA.
Compilation of State Laws and Regulations on Transportation of Radioactive Materials.
Jaqueline Bailey, and Craig Jefferies. Jan 80, 365p

This document is a compilation of State laws and regulations that deal with the transport of radioactive materials. Local government initiatives are not included.

18G. Radioactive Wastes and Fission Products

AD-B024 442/6 PC **A03**/MF **A01**

Army Engineer Waterways Experiment Station Vicksburg MS
Borehole Plugging Program (Waste Disposal). Report 1. Initial Investigations and Preliminary Data.
Miscellaneous paper,
John A. Boa, Jr. Jan 78, 39p Rept no. WES-MP-C-78-1
Distribution limitation now removed.

This report covers efforts during the first year of the program. A study was initiated to find competent grouts to be used in stemming boreholes associated with radioactive waste disposal. The grouts must be durable for several thousand years and be essentially impermeable. In addition, the grouts should be pumpable to depths of several thousand feet into environments of high temperature. Grouts for use in both salt and nonsalt formations are to be studied. This program is still underway. (Author)

PB80-143985 PC **A13**/MF **A01**

MITRE Corp., McLean, VA. METREK Div.
Alternative Disposal Concepts for High-Level and Transuranic Radioactive Waste Disposal.
Technical note,
Philip Altomare, Robert Bernardi, David Gabriel, Daniel Nainan, and William Parker. May 79, 284p MTR-7718, ORP/CSD-79-1
Contract EPA-68-01-3997

Various alternatives have been proposed for the disposal of high-level and transuranic radioactive waste generated from the nuclear electric power industry and the U.S. Defense program. The most advanced disposal option, and the one under active development, is the U.S. owned and operated deep-mined geologic repository. This report reviews the primary alternative concepts to the geologic repository, their present state-of-development and, to the extent possible, their environmental implications. The concepts included are: transmutation, extraterrestrial disposal, seabed disposal, ice sheet disposal, and other continental geologic disposal. Projections of radioactive waste quantities and technologies for partitioning and fractionation of the waste are also discussed.

18H. Radioactivity

AD-A079 560/9 PC **A03**/MF **A01**

Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
The History of Fallout Prediction.
Rept. for 1950-1979,
Jay C. Willis. 1 Jun 79, 37p
Report on NE 6.99 Special Study (Fallout Modeling).

The development of the science of fallout prediction in this country from 1950 to 1979 is described. The chronological description emphasizes early

developments and the relationships between some of the significant calculational models. The earliest work on fallout prediction discussed in that performed by RAND on Project Aureole in 1954, and the evolution is carried through to the derivatives of the DELFIC computer code. A section is devoted to the histories of four commonly used handbook prediction systems. (Author)

AD-A080 040/9 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Initial Nuclear Radiation Environments Due to Tactical Nuclear Weapons Detonated in Air-over-Ground and Air-over-Sea Geometries.
Technical rept.,
H. alan Robitaille . Jul 79, 32p Rept no. DREO-808
Abstract in French.

Calculations of the free-field neutron and secondary gamma-ray environments generated by the detonation of tactical standard-fission-weapons have been made for air-over-ground and air-over-seawater geometries. These data have been combined with previously published calculations of the radiation environments due to the primary prompt gamma-ray component, in order to predict the total radiation intensities induced along the air-ground interface, for various heights of weapon burst. (Author)

18I. Reactor Engineering and Operation

NUREG/CR-1160 PC **A05**/MF **A01**
Oak Ridge National Lab., TN. Nuclear Safety Information Center.
LMFBR Safety. Volume 7. Review of Current Issues and Bibliography of Literature (1978),
J. R. Buchanan, and G. W. Keilholtz. Jan 80, 84p
ORNL/NUREG/NSIC-166
Prepared in cooperation with Science Applications, Inc.

This report discusses the current status of liquid-metal fast breeder reactor (LMFBR) development. Selected bibliographic information on LMFBRs relative to the development and safety of the breeder reactor is presented for the year 1978. The bibliography consists of approximately 127 abstracts covering research and development, operating experience, and design practices. Keyword, author, and permuted-title indexes are included for completeness.

NUREG/CR-1201 PC **A10**/MF **A01**
Los Alamos Scientific Lab., NM.
Nuclear Reactor Safety.
Quaterly progress rept. 1 Jul-30 Sep 79,
J. F. Jackson, and M. G. Stevenson. Feb 80,
214p LA-8171-PR
Contract W-7405-eng-36
See also NUREG/CR-0993.

This quarterly report summarizes technical progress from a continuing nuclear reactor safety research program conducted at the Los Alamos Scientific Laboratory. The reporting period is from July 1 to September 30, 1979. This research effort concentrates on providing an accurate and detailed understanding of the response of nuclear reactor systems to a broad range of postulated accident conditions. The report is mainly organized according to reactor type. Major sections deal with light-water reactors, liquid metal fast breeder reactors, high-temperature gas-cooled reactors, and gas-cooled fast reactors.

NUREG/CR-1214-V-1 PC **A10**/MF **A01**
Mound Facility, Miamisburg, OH.
The Controllable Unit Approach to Material Control: Application to a High Through-Put Mixed Oxide Process. Volume 1,
Pyrtle W. Seabaugh,, Donald R. Rogers, H. Anthony Woltermann, Fred C. Fushimi, and Anthony F. Ciramella. Feb 80, 218p MLM-2532-VOL-1
Contract DE-AC04-DP00053
See also Volume 2, NUREG/CR-1214-V-2.

The Controllable Unit Approach (CUA) to Material Control is a systematic method to control nuclear materials by measurements. CUA was developed to test the use of performance regulations in controlling nuclear materials. In this study, CUA was applied to a 200-metric-ton mixed-oxide (4% PuO2 in UO2) process scheduled for completion in the 1980's. The performance criterion used for this study was to detect a loss (single or cumulative) of 2 kg of PuO2 from the mixed-oxide process over a two-month inventory period with a detection probability of 97.5%, and to detect the loss within one day of reaching the 2-kg magnitude.

NUREG/CR-1252 PC **A03**/MF **A01**
Argonne National Lab., IL.
Physics of Reactor Safety.
Quarterly rept. Jul-Sep 79.
Feb 80, 37p ANL-79-98
See also NUREG/CR-1096.

This Quarterly progress report summarizes work done during the months of July-September 1979 in Argonne National Laboratory's Applied Physics and Components Technology Divisions for the Division of Reactor Safety Research (RSR) of the U.S. Nuclear Regulatory Commission. The work in the Applied Physics Division includes reports on reactor-safety research and technical coordination of the RSR safety analysis program by members of the Reactor Safety Appraisals Group, Monte Carlo analysis of safety-related critical assembly experiments by members of the Reactor Computations Group, and planning of safety-related critical experiments by members of the Zero Power Reactor Planning and Experiments Group. Work on reactor core thermal-hydraulics was performed in ANL's Components Technology Division.

NUREG-0645-V-1 PC **A07**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Project Management.
Report of the Bulletins and Orders Task Force. Volume I.
Jan 80, 143p
See also Volume 2, NUREG-0645-V-2.

The results of the Bulletins & Orders review of the Office of Inspection and Enforcement bulletins, Commission Orders, and the Office of Nuclear Reactor Regulation generic evaluation of feedwater transients, small-break loss-of-coolant accidents, and other Three Mile Island Unit 2 related events in operating plants to confirm or establish the bases for their continued safe operation are summarized. As a result of its review, the Bulletins & Orders Task Force has concluded that: (1) the continued operation of the operating plants is acceptable provided that certain actions related to the plants' designs, operations, and training of operators are implemented consistent with the recommended implementation schedules; and (2) the actions taken by the licensees with operating plants in response to the IE bulletins provide added assurance for the protection of the health and safety of the public. In addition, the Bulletins & Orders Task Force has independently confirmed the safety significance of those related short-term and long-term actions recommended by other Office of Nuclear Reactor Regulation task forces.

NUREG-0645-V-2 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Project Management.
Report of the Bulletins and Orders Task Force. Volume II. Appendices.
Jan 80, 913p
See also Volume 1, NUREG-0645-V-1.

The results of the Bulletins & Orders review of the Office of Inspection and Enforcement bulletins, Commission Orders, and the Office of Nuclear Reactor Regulation generic evaluation of feedwater transients, small-break loss-of-coolant accidents, and other Three Mile Island Unit 2 related events in operating plants to conform or establish the bases for their continued safe operation are summarized. As a result of its review, the Bulletins & Orders Task Force has concluded that: (1) the continued operation of the operating plants is acceptable provided that certain actions related to the plants' designs, operation, and training of operators are implemented consistent with the recommended implementation schedules; and (2) the actions taken by the licensees with operating plants in response to the IE bulletins provide added assurance for the protection of the health and safety of the public. In addition, the Bulletins & Orders Task Force has independently confirmed the safety significance of those related short-term and long-term actions recommended by other Office of Nuclear Reactor Regulation task forces.

NUREG-0654 PC **A06**/MF **A01**
NRC/FEMA Steering Committee, Washington, DC.
Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.
Interim rept.
Feb 80, 121p
Also pub. as FEMA-REP-1.

The purpose of this interim guidance and upgraded acceptance criteria document is to provide a basis for NRC licensees, State and local governments to develop radiological emergency plans and improve emergency preparedness. The guidance is the product of the joint FEMA/NRC Steering Committee established to coordinate the agencies' work in emergency preparedness associated with nuclear power plants. This document supersedes previous guidance and criteria published by FEMA and NRC. It will be used by reviewers in determining the adequacy of State, local and nuclear power plant operator emergency plans and preparedness.

18J. Reactor Materials

NUREG/CR-0980 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for April-June 1979,
G. D. Whitman, and R. H. Bryan. Nov 79, 85p
ORNL/NUREG/TM-347
Contract W-7405-eng-26

The Heavy-Section Steel Technology (HSST) Program is an engineering research activity devoted to extending and developing the technology for assessing the margin of safety against fracture of the thick-walled steel pressure vessels used in light-water-cooled nuclear power reactors. The program is being carried out in close cooperation with the nuclear power industry. This report covers HSST work performed in April through June 1979, except for subcontractor contributions which may cover the three-month period ending in May.

18K. Reactor Physics

AD-A079 587/2 PC **A05**/MF **A01**
Air Force Technical Applications Center Patrick AFB FL
Integral Equation Space-Energy Flux Synthesis for Spherical Systems.
Final rept.,
Eugene W. Skluzacek. 21 Nov 79, 77p Rept no. AFTAC-TR-79-69

The calculations of neutron flux distribution and growth rate for small, spherically symmetric systems usually requires extensive computing time on the largest machines. To minimize computing time, a compromise between the simplicity of diffusion theory and the accuracy of transport theory is needed. The Serber-Wilson method, Feynman's method, and early flux synthesis methods are used as the foundation for integral equation synthesis (IES) which is an approximate, numerical technique for obtaining the spatial and energy neutron flux distributions in multiplying systems. In IES, the integral form of the neutron transport equation is specialized to spatial dependence only, and then solved numerically for the two lowest order eigenfunctions. Similar specialization to energy dependence only yields a second set of trial eigenfunctions. Using standard perturbation methods, the two sets of trial eigenfunctions are synthesized into a single, two-dimensional solution. The IES technique was used to calculate the flux and multiplication factor, K, of the critical plutonium sphere, Jezebel. Results for k agreed to within 0.01% of published values, whereas the spatial flux, when normalized at the center, agreed to within 8% at the outer assembly boundary.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A079 563/3 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center Watertown MA
Scattered Light Photoelastic Analysis of a Projectile Bulkhead to Structural Case Joint.
Final rept.,
Miloslav Benicek, and Jiro Adachi. Oct 79, 19p
Rept no. AMMRC-TR-79-54

Photoelastic stress analysis of the bulkhead-to-structural case pin joint of a projectile was carried out using the scattered light technique. Analysis provided three-dimensional stress distributions in critical areas of the joint including the pinhole, pin bearing surfaces, and joint bearing surfaces. Stress gradients through the wall were found to be large; however, stress concentrations were found to be moderate with a maximum value of 3.7. (Author)

AD-A079 569/0 PC **A02**/MF **A01**
Whittaker Corp North Hollywood CA Shock Hydrodynamics Div
Projectile Impact Ignition Characteristics of Propellants I. Deflagrating Composite Explosive.
W. H. Andersen, and N. A. Louie. 11 Aug 78, 9p
ARO-14396.3-E
Contract DAAG29-76-C-0063
Pub. in Combustion Science and Technology, v20 p153-160 1979.

No abstract available.

AD-A079 864/5 MF **A01**
Magnetic Analysis Corp Mount Vernon NY
Fessibility Study on the Use of Leakage Flux NDT Methods for Automatic Inspection of M-42 Grenade Bodies.
Ed Spierer, Donald Bugden, and Mauro Lupero. 1979, 100p
Availability: Microfiche copies only.

The purpose of this program was to determine, by use of laboratory setups. the effectivness of magnetic perturbation (leakage flux) techniques for locating and quantifying flaws in M-42 grenade bodies. Various magnetizing and scanning schemes were implemented in order to find surface and subsurface flaws with longitudinal or transverse orientations. Of special interest was the ability to find defects in the embossed area of the inner surface where there may be a higher probability of crack propagation. A side benefit is the possibility of ascertaining the presence and depth of the embossed area. The evaluation setups were developed about a simple bench lathe, but the eventual design goal of providing an automatic, high speed nondestructive inspection system was an overriding consideration in the design of the experiments. Some of the conceptual options for developing a production machine are presented in a later section of this report.

AD-A079 895/9 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Chemical Systems Lab
Ignition of Artillery Tracers Manufactured with Known Defects.
Technical rept. Oct 76-Feb 79,
Gerald C. Holst. Nov 79, 21p ARCSL-TR-79065, AD-E410 215

The need exists for a reliable, inexpensive method of testing artillery tracers for ignitability and burn rate prior to expensive field tests. In this study, a 1-kw CO_2 laser was used to ignite tracers having known defects. The most sensitive measure appears to be the energy required for ignition. Results indicate that tracers manufactured with variations in the igniter percent of graphite exhibit a large dispersion in energy required for ignition. Tracers manufactured with variations in the tracer magnesium granularity also exhibit large dispersion. However, there appears to be a direct relationship between energy required and consolidation pressure. Low consolidation pressure tracers require more energy than do standard tracers. (Author)

AD-A079 896/7 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Ballistic Evaluation of 19-Perforation Propellant in the 155-mm Propelling Charge, M203E1.
Memorandum rept.,
A. W. Horst, J. R. Kelso, J. J. Rocchio, and T. C. Minor. Oct 79, 72p ARBRL-MR-02968, AD-E430 356
Supersedes rept. no. ARBRL-IMR-644.

Top-zone propelling charges for the Army 155-mm Howitzer were manufactured using 19-perforation, M30A1, granular propellant and tested against M203E1 Propelling Charges employing standard 7-perforation propellant. Velocities, chamber pressures, pressure wave levels, and ignition delays were essentially equivalent for the two charges when fired at ambient temperatures or after cold conditioning. Significant differences in performance, however, were exhibited by the two charges when fired hot.

AD-A079 952/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Technical Support Directorate
Explosives: A Bibliography of Monographs and Journals in the Scientific and Technical Information Division (Technical Library) of the U.S. Army Armament Research and Development Command.
Special publication,
Patricia Altner. Nov 79, 42p ARTSD-SP-79001, AD-E400 381

A bibliography of monographs and a holdings list of journals from the Scientific and Technical Information Division, Technical Support Directorate, has been compiled. The monographs are listed chronologically by decade, and the library call number is included. As an aid in accessing this material, a personal name index of authors and editors is provided.

AD-A080 043/3 PC **A02**/MF **A01**
Propellants Exposives and Rocket Motor Establishment Waltham Abbey (England)
Initiation of Aerated Nitroglycerine in an Eductor.
Technical rept.,
D. G. Tasker. Oct 79, 14p PERME-TR-120, DRIC-BR-70957

A technique is described for the measurement of the shock wave pressures generated within nitroglycerine (NG), when the liquid surface strikes a steel cylinder. These pressures have been observed in a model of a Biazzi Nitroglycerine Eductor; they are shown to be in close agreement with those theoretically predicted and indicate that this mechanism for the initiation of explosion in NG requires serious consideration. (Author)

AD-A080 050/8 PC **A02**/MF **A01**
Naval Weapons Station Yorktown VA
Non-Carcinogenic Replacements for PBNA Antioxidant in PBXN-105 and PBXN-106 Explosives.
Lloyd C. Carlton. Jan 80, 18p Rept no. NWSY-TR-80-1

Explosive mixes of PBXN-105 and PBXN-106 were prepared using Cyanox 2246 and CAO-14 antioxidants in lieu of phenyl-beta-naphthylamine (PBNA). Specification tests, as well as other related tests, were performed on the system. Findings indicate either of the antioxidants are suitable replacements. (Author)

AD-B004 405/7 PC **A03**/MF **A01**
General Electric CO Bay Saint Louis Miss Engineering and Science Services Lab
Identification and Evaluation of Hazards Associated with Blending of Violet Smoke Mix by Jet Airmix Process.
Technical rept. Jul-Nov 74,
Fred L. McIntyre. Mar 75, 42p EA-4D91, EM-CR-75001
Contract NAS8-27750
Distribution limitation now removed.

A hazards evaluation was conducted to identify and determine the magnitude of hazards in full-scale blending of Violet Smoke Mix IV by the Jet Airmix Process. Subscale and full scale blending tests and critical mass and thermal ignition tests were conducted to determine the effects of geometry on sub-scale and full scale tests. Results indicate that hazards associated with mixing Violet Smoke Mix IV are minimal. (Author)

AD-B007 377/5 PC **A03**/MF **A01**
Ballistic Research Labs Aberdeen Proving Ground MD
Calculations of Fragment Velocities from Naturally Fragmenting Munitions.
Memorandum Rept.,
R. R. Karpp, and W. W. Predebon. Jul 75, 31p
Rept no. BRL-MR-2509
Distribution limitation now removed.

Calculational techniques for predicting warhead performance based upon the fragment velocity distribution are presented and compared with experimental data. A simple technique is shown to be inadequate for many practical configurations. For accurate distributions, a two-dimensional, time-dependent, finite-difference code is shown to be adequate. As an integral part of this code, a model for the effects of casing fragmentation and explosive gas leakage has been included. (Author)

AD-B007 705/7 PC **A05**/MF **A01**
Aai Corp Cockeysville MD
Development of a Thin-Wall 20mm Explosive Projectile.
Final rept. Apr 74-Apr 75,
Walter L. Black. May 75, 76p AAI-ER-8296, AFATL-TR-75-76
Contract F08635-74-C-0116
Distribution limitation now removed.

Development of an improved 20mm high explosive incendiary (HEI) projectile is discussed. Improved performance is accomplished by configuration changes which reduce projectile weight, improve the aerodynamic shape, and increase the high explosive material. The improvements are achieved by thinning the projectile walls, by the choice of material, heat treat, and incorporation of a plastic rotating band. The analytical design and test experience acquired in developing this improved projectile are reviewed. Details of the operating conditions for the injection molding process used to apply the plastic rotating bands are given. (LS-PL).

AD-B010 100/6 PC **A04**/MF **A01**
Coloney (Wayne H) CO Inc Tallahassee Fla
GFU-6/E 30mm Ammunition Loader for GAU-8A Gun System.
Final rept. Sep 74-Oct 75,
Charles E. Benedict. Dec 75, 53p AFATL-TR-75-158
Contract F08635-75-C-0021
Distribution limitation now removed.

This effort involved the technical evaluation of an engineering model; design, fabrication and testing of the prototype; delivery of the system to Eglin AFB, Florida for gun system interface and technical assistance during the test and evaluation at Edwards AFB, California. A single prototype was constructed. Descriptions and details of the system and its operation are included and safety, reliability and maintainability features are discussed. Recommendations for engineering changes for a production loader are also included. (Author)

AD-B013 355/3 PC **A02**/MF **A01**
Air Force Armament Lab Eglin AFB Fla
Yaw Card Range Tests of a 30mm Frangible TP Projectile.
Final rept. Mar 75-Sep 75,
Kenneth O. West. Jan 76, 20p Rept no. AFATL-TR-76-5
Distribution limitation now removed.

Experimental results of yaw card range test of a 30mm frangible TP projectile are presented. Results include experimentally determined static and dynamic stability derivatives and drag coefficients obtained at a free-flight Mach number of 3.02. (Author)

AD-B014 108/5 PC **A02**/MF **A01**
Air Force Armament Lab Eglin AFB Fla

Yaw Card Range Tests of a 30mm Target Projectile.
Final rept. Mar-Sep 75,
Kenneth O. West. Jan 76, 23p Rept no. AFATL-TR-76-1
Distribution limitation now removed.

Experimental results of yaw card range tests with 30mm target projectiles are presented. Results include experimentally determined static and dynamic stability derivatives and drag coefficients obtained at a free-flight Mach number of 3.0. (Author)

AD-B015 193/6 PC **A05**/MF **A01**
Systems Science and Software la Jolla Calif
A Summary of Several Parametric Investigations of the Effect of Varying the Material Properties of a Heavy Metal Penetrator.
Final rept. 4 Feb-30 Jun 76,
L. J. Hageman, R. T. Sedgwick, and J. L. Waddell. Aug 76, 77p SSS-R-76-2986, AFATL-TR-76-97
Contract F08635-75-C-0044
Distribution limitation now removed.

The two-dimensional HELP computer program was employed to augment two earlier parametric investigations involving the effects of varying the material properties of a heavy metal penetrator on the normal penetration of a 5.08-cm-thick steel plate. The projectile material properties that were varied were the shear yield strength, the tensile failure threshold, the shear modulus, and the bulk modulus. Conclusions were drawn from analysis of the results from the current calculational effort as well as those from the two previous studies. (Author)

AD-B015 229/8 PC **A04**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
A Characterization Study of Several Heat Resistant Explosives in Mild Detonating Cords.
Final rept. 1 Jul 74-31 Dec 75,
E. Eugene Kilmer. 30 Aug 76, 56p Rept no. NSWC/WOL/TR-76-43
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

A study was made of the performance of three new heat resistant explosives fabricated into mild detonating cords. Cords were exposed to temperatures from 280 C to 326 C in sealed copper tubes. After exposure to these temperatures, the cord detonation velocity was measured. The dynamic compressibility and heat of formation of TPT were also determined. TPT was judged to be the best explosive for heat resistant detonating cord and was characterized to generate data for a procurement specification. (Author)

AD-B016 707/2 PC **A06**/MF **A01**
Battelle Columbus Labs Ohio
Design of Explosion Blast Containment Vessels for Explosive Ordnance Disposal Units.
Final rept. 9 Sep 71-30 Jun 75,
B. Dale Trott, Joseph E. Backofen, Jr., and John J. White, III. Jun 75, 114p
Contract DAAA21-72-C-0129
Distribution limitation now removed.

This report describes an experimental and analytical investigation of the design and performance of spherical vessels for containment of explosive blast for application by explosive-ordnance disposal teams. During this program a total of eight spherical steel containment vessels were fabricated. The diameters and wall thicknesses investigated were 2.0 ft with 0.5-in. walls, 3.0 ft with 0.75-in. walls, and 4.5 ft with 1.0-in. walls. The vessel ports were approximately one radius in diameter and completely closed by flat steel doors overlaying the ports from the inside. During the course of this program a computer code was developed which calculated the maximum elastic-plastic response and residual plastic strain of spherical, thin-walled vessels in response to an internal, triangular shock wave followed by a static internal pressure. The code in its present form uses measured shock-wave parameters from Pentolite and static pressures which may be calculated for a number of explosives.

AD-B018 467/1 PC **A04**/MF **A01**
Ballistic Research Labs Aberdeen Proving Ground MD
Wind Tunnel Experiments on the Effect of Combustion in the Wake Region of Supersonic Projectiles-Test Series III.
Memorandum rept.,
J. Richard Ward, Frank P. Baltakis, and Dennis J. Mancinelli. Apr 77, 56p Rept no. BRL-MR-2737
Supersedes rept. no. BRL-IMR-478 dated Feb 76.
DDC form 55 not necessary for document request.
Distribution limitation now removed.

This report summarizes the third set of wind tunnel tests to evaluate the effect of combustion of pyrotechnics on the base drag of supersonic projectiles. In this test series, a larger diameter model was used to expand the range of injection parameters for R20C. It was found that the base pressure rise vs I, the injection parameter, for R20C could be correlated by an expression requiring two parameters. The maximum base drag reduction achieved with pyrotechnics at M sub infinity = 2.0 was 68%. The maximum specific impulse at M sub infinty = 2.0 was nearly 8kN-s/kg. The maximum specific impulse was observed at an I value of 0.002. Direct measurement of the specific impulse by means of a force balance agreed with the specific impulses computed from integrating base pressure-time histories. (Author)

AD-B019 894/5 PC **A04**/MF **A01**
Brigham Young Univ Provo Utah
Evolution of the NWC Thermal Standard. Part 3. Application and Evaluation of the Thermal Standard in the Field.
Summary rept. Jun 71-Jun 76,
Richard D. Ulrich, and Howard Schafer. May 77, 64p NWC-TP-4834-Pt-3
Contract N00123-71-C-1706, N60530-76-C-0091
See also Part 2, AD-888 252L.
Distribution limitation now removed.

The thermal standard has proven to be a valuable tool as a means to (1) predict hourly surface temperatures of adjacent ordnance, replacing the need to instrument a large variety of ordnance, (2) predict cumulative probability-temperature curves for various items, and (3) generate a 'typical day' and, using only 10% of the daily maximum and minimum temperatures, predict the annual cumulative probability-temperature curve accurately for various ordnance items. This will allow for the relatively simple reduction of a large volume of data. Future uses, e.g., environmental work, for the concept of the thermal standard are suggested.

AD-B026 153/7 PC **A02**/MF **A01**
Computer Sciences Corp Bay St Louis Miss Engineering and Science Services Lab
Friction Stimuli Studies in Blending Operations.
Final rept. Nov 76-Apr 77,
F. L. McIntyre, and G. L. McKown. Feb 78, 11p ARCSL-CR-78002, SBIE-AD-E400120
Contract NAS13-50
See also rept. no. ARCSL-CR-78003, AD-B026 731. DDC Form 55 not necessary for document request.
Distribution limitation now removed.

Tests were performed on various pyromixes to determine friction stimuli due to the inducement of foreign objects and metal-to-metal contact during in-process blending. The test results indicated that the frictional energy required to ignite the pyrotechnic compositions was greater than those generated in these experiments. The initiation of pyrotechnics by friction during blending processes may be less hazardous than previously postulated based on reported incidents and accidents. (Author)

AD-B026 731/0 PC **A02**/MF **A01**
Computer Sciences Corp Bay St Louis Miss Engineering and Science Services Lab
Parametric Studies of Pyrotechnic Materials by Bomb Calorimetry.
Final rept. Feb 76-Apr 77,
F. L. McIntyre, and G. L. McKown. Feb 78, 12p ARCSL-CR-78003, SBIE-AD-E400121
Contract NAS13-50
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

A series of tests were performed in a large bomb calorimeter using four sulfur-based colored-smoke compositions. It was found that (1) energy output increases with decreasing sample density, (2) violet smoke is more energetic than the other colored-smoked mixes, and (3) the energy output increases significantly with increased ambient pressure. (Author)

PAT-APPL-6-096 720 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Containment and Release Device for Fluids.
Patent Application,
Donald J. Carignan. Filed 21 Nov 79, 11p AD-D006 894/0
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a dispenser retains a hermetically sealed metal canister which holds a pyrophoric fluid, radar chaff, other electronic countermeasure materials or a combination thereof for ejection from an aircraft. Several openings in the canister are sealed with Pyrofuze foil material closures and a Pyrofuze wire braid is interconnected between each of the closures and the canister in having one end thereof fixedly attached to the canister. A safety tab on one corner of the canister extends downward between the delay braid and the wire braid to prevent cross ignition until the canister is fully ejected from the dispenser. When a gas producing squib on the dispenser is fired, the Pyrofuze delay braid is ignited by the flame front from the squib and the canister is forced from the dispenser causing the safety tab to be automatically removed from the canister. This allows the delay braid to ignite the Pyrofuze wire braid which burns to each of the closures causing them to burn away thereby releasing and igniting the pyrophoric material from the canister. (Author)

PAT-APPL-6-950 944 PC **A02**/MF **A01**
Department of the Navy Washington DC
Process for Generation Gas for Telescoping Cartridge Operation.
Patent Application,
William P. Peck. Filed 13 Oct 79, 7p AD-D006 805/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A gas generating propellant for use in combination with sealed volume telescoping cartridges yields high pressure for cartridge operation and low residual pressure after cool down. The propellant formulation comprises a high percentage of condensible materials including a binder and an oxidizer and an optional fuel such as light metals and light metal compounds represented by boron, lithium, and lithium aluminum hydride. (Author)

19B. Bombs

AD-B007 733/9 PC **A05**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station Tenn
Static and Dynamic Stability Characteristics of the Fixed-Fin and Inflatable Stabilizer Retarder Configurations of the MK-82 Store at Transonic Speeds.
Final rept.,
C. F. Anderson, and W. E. Carleton. Nov 75, 92p AEDC-TR-75-149, AFATL-TR-75-141
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn., Rept. no. ARO-PWT-TR-75-140.
Distribution limitation now removed.

An investigation was conducted in the Aerodynamic Wind Tunnel (4T) to obtain the static stability and pitch-damping characteristics of the Fixed-Fin (FF) and Inflatable Stabilizer Retarder (ISRe) configurations of the MK-82 store with solid and slotted fins and with various fin tabs. The static phase was conducted using 0.20-scale models, and the dynamic phase was conducted using 0.442-scale models. The tests were conducted at Mach numbers from 0.4 to 1.3 for angles of attack up to 42 deg and Reynolds numbers from 200,000 to 1,000,000 based on the centerbody maximum diameter. All configurations tested were statically and dynamically stable. The ISRe configurations had a greater static stability margin than the FF configurations. Use of the slotted fin reduced the

static stability margin of the FF configurations but had no significant effect on the ISRe configurations. The slotted fin had little or no effect on the dynamic stability characteristics. Increasing fin tab angle generally caused an increase in dynamic stability for subsonic Mach numbers and a decrease for supersonic Mach numbers. The dynamic stability generally increased with increasing angle of attack. (Author)

AD-B008 209/9 PC **A07/MF A01**
Arnold Engineering Development Center Arnold Air Force Station Tenn
Magnus and Roll-Damping Characteristics of the Fixed-Fin and Inflatable Stabilizer Retarder Configurations of the MK-82 Store at Transonic Speeds.
Final rept.,
A. R. Wallace, and T. O. Shadow. Dec 75, 144p AEDC-TR-75-163, AFATL-TR-75-159
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn., Rept. no. ARO-VKF-TR-75-146.
Distribution limitation now removed.

Wind tunnel tests to Measure the Magnus and roll-damping characteristics of a bomb shape, which is a candidate for replacement of the MK-82 Snakeye Bomb, were conducted at Mach numbers from 0.4 to 1.3 and Reynolds numbers, based on model diameter from 540,000 to 1,000,000. Two basic fin configurations, the fixed fin (FF) and the inflatable stabilizer retarder with extender (ISRE), were tested with and without wedge-shaped tabs and slots.

AD-B014 345/3 PC **A04/MF A01**
Auburn Univ Ala Dept of Aerospace Engineering
Summary and Analysis of Wind Tunnel Tests of Several Store Configurations at High Subsonic and Low Supersonic Speeds.
Final rept. Sep 74-Sep 75,
Fred W. Martin, John E. Burkhalter, and Malcolm A. Cutchins. Mar 76, 52p AFATL-TR-76-22
Contract F08635-75-C-0023
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The data obtained from wind tunnel tests of five store configurations have been summarized and documented. Two series of tests were run; force and captive trajectory tests were conducted in late 1974 and pressure tests were completed in early 1975. The purpose of the two series of tests was to help identify a store shape and configuration which would have acceptable release characteristics from a parent aircraft. From the force and captive trajector tests, it was found that all of the store shapes tested had marginal, but acceptable, release characteristics at a Mach number of 0.5, but none had acceptable trajectories at Mach numbers above 1.0. The smaller diameter stores release better than the 16-inch, but are still only marginally acceptable. The pressure tests provided some answers as to the reason for high negative pitching moments on the stores. Large pressure differences exist over the nose regions on all the stores which have a tendency to pitch the store downward. No final acceptable store was identified. (Author)

19C. Combat Vehicles

AD-A079 550/0 PC **A03/MF A01**
Electro-Voice Inc Buchanan Mi
Development of Improved Earphone-Earcup System for AVC Helmet.
Final technical rept. Aug 78-Oct 79,
Michael A. Bryson. Nov 79, 40p CORADCOM-78-0176-F
Contract DAAB07-78-C-0176

This document covers the technical details of work performed to improve the noise attenuation characteristics and frequency response of an earphone-earcup system used in DH-132 AVC Helmet. This new design results in a system that is rugged, lightweight, has improved intelligibility, and reduced medical hazard for crewmen in tracked armored vehicles. (Author)

AD-B026 310/3 PC **A04/MF A01**
Army Armament Materiel Readiness Command Rock Island Il Cost Analysis Div
Independent Production Cost Estimate: XM1 Tank Main Armament Evaluation.
Technical rept.,
Gene Johnston, Gerald Kalal, Joseph Robinson, and Laurence Stoll. Nov 77, 58p Rept no. DRSAR-CPE-77-9
Distribution limitation now removed.

Parametric estimating of the recurring investment costs for tank main armament systems has recently been improved with new modeling techniques, as well as with an improved data base. This report illustrates the use of such estimating techniques as prepared for the XM1 Tank Main Armament Evaluation (TMAE). It also expands parametric estimating techniques to white phosphorous (WP), antipersonnel (APERS), and target practice discarding sabot (TPDS) rounds. The options covered in this study are: the US option using the 105mm M68 gun, the United Kingdom's 120mm rifled gun, and the Federal Republic of Germany's GE 120mm smoothbore gun. Each gun is furnished an appropriate family of ammunition. The scope of the weapon Independent Unit Production Cost is limited to the recurring unit manufacturing cost of the cannon and breech assemblies including engineering and product assurance support, but excluding first destination transportation. The ammunition cost excludes the cost of Government engineering and quality assurance support, but includes first destination transportation.

PB80-138878 PC **A03/MF A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
XM1 Tank's Reliability Is Still Uncertain.
Report to the Congress.
29 Jan 80, 28p PSAD-80-20

Recent testing indicates that in the past year the XM1 tank is making steady progress in overcoming many of its reliability problems. However, doubts still remain about its turbine engine in view of the alarming number of losses in power which still persist. The final phases of testing which begin this year should furnish reliable evidence as to the XM1's readiness for full production. Until this readiness is demonstrated, the Congress should limit the tank's further procurement to a low rate. The Secretary of Defense should initiate a full-scale diesel engine development program for the XM1 if the turbine problems persist.

19D. Explosions, Ballistics, and Armor

AD-A079 600/3 PC **A04/MF A01**
Army Engineer Waterways Experiment Station Vicksburg MS Structures Lab
Feasibility of Use of Simple Models to Test Explosive Cratering of Roads on Slopes in Rock.
Final rept.,
Colin C. McAneny. Sep 79, 59p Rept no. WES/MP/SL-79-19

Cratering charges were detonated in unstemmed shafts drilled in test beds fabricated of bricks, in order to explore whether such beds might offer a simple approximate way to model the cratering behavior of jointed rock. In two beds where bricks were close-packed but not cemented, rubble mounds rather than apparent craters were formed. The beds appeared to be so permeable that the pressure of the explosion gases was rapidly dissipated and much of the gases' energy was effectively wasted. In cemented beds on level ground, smaller apparent craters resulted than were predicted from published cratering curves for dry rock. In a cemented bed on a hillside, much more damage and material movement occurred than for a comparable bed on level ground. The small apparent craters produced may have been caused in part by the vertical joints in the beds, which may have induced vertical trajectories of ejecta particles. Excavated true craters in cemented beds were square-shaped with flat floors, conforming to previously published descriptions of true craters in horizontally bedded, vertically jointed rock.

AD-A079 606/0 PC **A02/MF A01**
Sri International Arlington VA
Simple One Dimensional Models of the Penetration of Rods.
Technical note,
Robert E. LeLevier. Dec 79, 10p Rept no. SRI-JSN-79-09
Contract MDA903-78-C-0086, DARPA Order-2504

This note discusses a simple one dimensional model for describing the penetration of armor by rods based upon work by Alekseevshii and Gogolewski. We show that these models give incorrect results because they assume that the mass of the target material is constant, not a function of time as it actually is. We show that assuming this time dependence of the mass, yields results quite consistent with experimental data. (Author)

AD-A079 893/4 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
NOVA Code Simulation of a 155-mm Howitzer: An Update.
Memorandum rept.,
Albert W. Horst, and Thomas R. Trafton. Oct 79, 35p ARBRL-MR-02967, AD-E430 354
Supersedes ARBRL-IMR-627, dated Jan 79.

The NOVA two-phase flow interior ballistic code was employed to simulate ignition, flamespreading, and pressurization in a 155-mm Howitzer. For these calculations, all input data were independently determined, and comparison was made between predicted results and experimental data. Good agreement between theory and experiment was shown to exist for overall pressurization profiles and, in one case, for pressure waves themselves. However, experienced ignition delays were grossly underpredicted, suggesting several specific limitations to the model. (Author)

AD-A079 942/9 PC **A03/MF A01**
Electromechanical Systems of New Mexico Inc Albuquerque
Soil Strain Measurements on Misers Bluff. Phase II.
Topical rept. 1 May 78-30 Apr 79,
R. A. Shunk. 30 Apr 79, 43p ESI-79-001-TR, DNA-4833T, AD-E300 648
Contract DNA001-78-C-0260

Soil strain measurements were made on the MISERS BLUFF - Phase II tests. The first test, a 109 metric ton ANFO explosion, indicated that the tubular, telescoping strain gage with large end plates and a DC LVDT sensing element should be adequate to measure strains on the second test which was the detonation of six 109 metric ton ANFO charges on the corners of a 100 m hexagon. The strains observed on the second event were much larger than on the first event. Three locations were instrumental to 1.6 m in depth for vertical strain, two halfway between charges on opposite sides of the array and one 6 m from the array center. The strains were initially compressive due to air shock loading and then extensional during the negative phase. Extensional strains greater than 50% were observed at the 6 m location down to a depth of 0.9 m. The air shock loading at the locations between charges was not the same, nor were the soils identical. Strains of -12% to +30% were typical at near surface locations. The final or residual strain measured on recovery was usually compressive except at one location where the soil was very powdery. (Author)

AD-B009 421/9 PC **A03/MF A01**
Ballistic Research Labs Aberdeen Proving Ground MD
Effect of Large High-Frequency Angular Motion of a Shell on the Analysis of its Yawsonde Records.
Final rept.,
Charles H. Murphy. Feb 76, 29p Rept no. BRL-MR-2581
Supersedes Rept. no. BRL-IMR-450.
Distribution limitation now removed.

The usual data analysis of yawsonde records assumes that the sun angle is constant during one revolution of the shell and uses three successive sightings of the sun to yield sun angle and angle theta, the roll rate with respect to the plane containing the sun and the missile's axis. An improved analysis technique is described which assumes a linear variation of the sun angle and uses five successive sun sights to obtain sun angle and

angle theta. For large high-frequency yawing motion, angle theta has a periodic component which is usually at the frequency of the yawing motion. An expression for this periodic component is derived and it is shown that the average of angle theta is very close to the spin rate of the shell.

AD-B009 470/6 PC **A05**/MF **A01**
Air Force Armament Lab Eglin AFB Fla
Optimization of Flame Fuel Dissemination Patterns Associated with Firebombs.
Final rept. Feb-Oct 74,
Jerry D. Abrams. Feb 75, 85p Rept no. AFATL-TR-75-24
Distribution limitation now removed.

A research effort was conducted to find the optimum dissemination of flame agent from a firebomb. The basic approach was to model under laboratory conditions static dissemination patterns. This involved controlling the physical environment of the experiments and representative collection of data. A computer program was used to reduce and analyze the data. The measuring criteria for optimization were calculated in the computer analysis. These criteria were optimized to give the most effective fuel break up and dissemination pattern. The parameters characterizing this pattern were defined, and an optimum model were constructed. Although the experimental results of this model are unique to the physical conditions of the experiments and cannot be applied directly to dynamic situations, the technique and results offer excellent relative data for the screening of possible dissemination patterns and firebomb effectiveness studies.

AD-B015 244/7 PC **A04**/MF **A01**
Naval Weapons Center China Lake Calif
Parametric Trajectory Program.
Technical publication,
John E. Peterson. Oct 76, 75p NWC-TP-5864, GIDEP-E067-0700, GIDEP-195.45.00.00-X7-02
Distribution limitation now removed.

This aeroballistic three-degree-of-freedom computer program was developed to predict trajectories of both air-fired and ground-fired projectiles, and to prepare trajectory tables to assist designers of new or experimental ordnance. It is an efficient and inexpensive program to run, and is thus valuable in perparing extensive data for analysis of various projectile design parameters. (Author)

AD-B015 343/7 PC **A08**/MF **A01**
Systems Science and Software la Jolla Calif
HELP - A Multimaterial Eulerian Program in Two Space Dimensions and Time.
Final rept. Jul 74-Jun 75,
Laura J. Hageman, Darin E. Wilkins, Robert T. Sedgwick, and Jerry L. Waddell. Apr 76, 170p AFATL-TR-76-45-Bk-1
Contract F08635-75-C-0044
See also Book 2, AD-B015 344L.
Distribution limitation now removed.

HELP is a two-dimensional, multimaterial, Eulerian Code for solving material flow problems in the hydrodynamic and elastic-plastic regimes. Although the code is basically Eulerian, material interfaces and free surfaces are propagated through the Calculation Mesh, in a Lagrangian manner, as discrete interfaces across which the materials are not allowed to interdiffuse. This interface treatment gives HELP a distinct advantage over other pure Eulerian Codes and allows it to be applied to the solution of a variety of complex, multimaterial problems. The basic HEPL techniques have been exercised over a wide range of solutions including hypervelocity and ballistic impact, fragmentation munitions, shaped charge jet formation, and shaped charge jet penetration. Considerable confidence has been gained in the basic numerical model. (Author)

AD-B015 344/5 PC **A12**/MF **A01**
Systems Science and Software la Jolla Calif
HELP - A Multimaterial Eulerian Program in Two Space Dimensions and Time.
Final rept. Jul 74-Jun 75,
Laura J. Hageman, Darin E. Wilkins, Robert T. Sedgwick, and Jerry L. Waddell. Apr 76, 265p AFATL-TR-76-45-Bk-2
Contract F08635-75-C-0044
See also Book 1, AD-B015 343L.
Distribution limitation now removed.

The primary functions of each subroutine as well as the definitions of important variables are presented. The flags and conventions which are unique to the HELP code are also listed and discussed. The HELP input and output are illustrated by considering three representative calculations: (1) Shaped charge liver collapse, (2) perforation of a this target, and (3) impact into a thick target.

PB80-134786 PC **A03**/MF **A01**
Maryland Univ., College Park.
Experimental Investigation of the Effect of Time Delays on Fragmentation in Homogenous Models,
Bhupinder P. Singh. 1979, 27p NSF/RA-790277
Grant NSF-APR77-05171

The effect of delay blasting on fragmentation is studied in this paper. The optimum delay sequence for fragmentation was determined. Homogeneous two dimensional transparent polymeric models were employed so that high speed photography in conjunction with dynamic photoelasticity could record the full field state of stress associated with explosive loadings. The transparent material also allowed observation of the initiation and extension of cracks. Two ranges of delays were selected for study. Short delays were used to investigate the effect of interaction of stress waves from the second hole with the stress waves from the first hole. In a second series, utilizing relatively long delays, cracks from the first hole were allowed to propagate a finite distance before the second explosion was set off. This was done to investigate the effect of interaction of stress waves from the second hole with the cracks from the first hole. It was found that there was a significant increase in fragmentation when the second hole was initiated as the cracks resulting from the first detonation reached it.

19E. Fire Control and Bombing Systems

AD-A079 749/8 PC **A06**/MF **A01**
Northrop Corp Anaheim CA Electro-Mechanical Div
Automatic Target Cuer.
Quarterly progress rept. no. 1, 18 May-31 Aug 79,
B. Deal, C. M. Lo, R. Taylor, V. Norwood, and H. Henning. 23 Oct 79, 101p Rept no. NORT-79Y100
Contract DAAK70-79-C-0066

This is the first quarterly progress report for the ATC program. It covers system organization and specific algorithm development, leading to the construction of a real-time target cueing system. (Author)

AD-A079 752/2 PC **A06**/MF **A01**
Northrop Corp Hawthorne CA Aircraft Group
Advanced FIREFLY Assessment Generalized Mechanization Requirements Report.
Interim rept. 25 Oct 78-Feb 79,
S. J. Asseo. Jun 79, 112p AFAL-TR-79-1092
Contract F33615-78-C-1503

The requirements for the design of the Generalized Mechanization of the FIREFLY concept of Integrated Fire and Flight Control to be implemented in a digital simulation has been completed. This generalized mechanization consists of a set of equations, algorithms, and control laws capable of being programmed into an airborne digital computer which can be specialized to perform successfully in a variety of tactical aircraft with differing avionics sensors, fire control algorithms, control laws, flight control systems, and weapon delivery modes. The document first addresses the scope of the requirements analysis followed by a description of the analysis done in deriving the requirements of the generalized mechanization. Finally, the requirements are summarized in a section discussing them explicitly in relation to their place in the overall fire control system. A discussion of the work done on the FIREFLY II familiarization and initial analysis of two of the potential advanced concepts for evaluation is contained in the appendices. (Author)

AD-B010 501/5 PC **A04**/MF **A01**
Texas Instruments Inc Dallas
RF-4C Digital Signal Transfer Unit Multisensor Display System (DSTUMDS).
Final technical rept. 1 Nov 73-15 Sep 74,
Glynn Raymer. Feb 76, 73p TI-U3-707600-02, AFAL-TR-75-170
Contract F33615-74-C-1111
Distribution limitation now removed.

This document is a final report which describes the design, development, and preliminary evaluation of a Digital Signal Transfer Unit Multisensor Display System (DSTUMDS) for the RF-4C aircraft and associated avionics equipment. The body of this report outlines program objectives, equipment description and a general theory of equipment operation.

AD-B026 467/1 PC **A04**/MF **A01**
Naval Weapons Center China Lake Calif
Launch Opportunity for Air-to-Ground, Visually Delivered Weapons.
Target acquisition study rept. for period ending 1977,
Ronald A. Erickson, and Carol J. Burge. Jan 78, 59p Rept no. NWC-TP-6005
Contract MIPR-RA02-77
Distribution limitation now removed.

This report presents a method for computing the probability of an aircrew being able to visually locate a ground target and launch a weapon against it. The major factors used in the computations are target acquisition performance, aircraft maneuvering requirements, terrain masking, visibility, and weapon operating time. Estimates of these factors are based on real-world data whenever possible, as opposed to mathematical modeling. The algorithm used to combine these factors is described, the computer program is given, and sample results are presented. The results show that the probability of releasing or launching a weapon on a target is quite low in many situations. (Author)

19F. Guns

AD-A079 666/4 PC **E05**/MF **E05**
Army Materiel Development and Readiness Command Alexandria VA
Engineering Design Handbook. Breech Mechanism Design.
Feb 79, 247p Rept no. DARCOM-P-706-253

This handbook is devoted to a description of a rational design sequence and methodology needed to take a particular breech mechanism from conception-as prompted military needs and technical requirements generated for a given weapon-to the stage of acceptance and production. Major divisions of the handbook provide information and guidance on the various design interrelationships involved. Topics include: Breech Mechanism Types; Design Constraints-- Ammunition Constraints, Weapon interfaces, Breech and subassemblies; Functional requirements, and Design requirements; Design Criteria and Procedures--Initiation through prototype; Development Criteria and Procedures, and Production Planning.

AD-A080 054/0 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
M198 Howitzer Auxiliary Mover Demonstration.
Final rept.,
Joseph Monolo. Sep 79, 43p Rept no. NSWC/TR-79-304

This report documents a limited operational test to determine the feasibility of the J. I. Case MC4000 rough terrain forklift as a candidate auxiliary mover for the M198 howitzer. The tests were performed using a standard MC4000 forklift fitted with an experimental pintle. The tests were conducted at Fort Bragg, NC, simulating typical landing zone terrain. (Author)

AD-B004 403/2 PC **A03**/MF **A01**
Army Arctic Test Center APO Seattle 98733
Check Test of Launcher, Grenade, 40mm, M203, under Arctic Winter Conditions.
Final rept. 20 Nov 74-26 Feb 75,
Benjamin P. Owen. 14 Apr 75, 50p
Distribution limitation now removed.

The U.S. Army Arctic Test Center conducted a Check Test of an Improved Launcher, Grenade, 40mm, M203 under arctic winter conditions at Fort Greely, AK. The purpose of the test was to evaluate improvements intended to correct previously reported problems related to guide rails, handgrips, and primer punchouts. The test was conducted at ambient temperatures varying from -4 F to -64 F in a variety of typical arctic field locations. A total of 1000 rounds of 40mm, M433, HEDP ammunition was fired from each of five improved M203 launchers. Testing consisted of preoperational inspection, transportability and handling, maintenance evaluation, reliability, and adequacy of corrective actions. Cold weather performance characteristics of the 40mm, M433, HEDP ammunition were recorded and reported for information only. It was concluded that the previously reported problems had been corrected and that the improved M203 launcher can be operated successfully in the arctic winter environment. It was recommended that the improved M203 launcher be considered acceptable for use in the Arctic.

PAT-APPL-6-097 462 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Last Round Detection Device.
Patent Application,
Filed 26 Nov 79, 17p AD-D006 890/8
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The device is for use with an ammunition storage drum for a modern multi-barrel high rate-of-fire machine gun (i.e., 'Gatling' type gun) system, in which unfired ammunition rounds are transported from the drum to the gun, and the cases of the spent ammunition are returned from the gun to the drum. When two generally, oppositely positioned spent ammunition sensors within the drum simultaneously detect spent ammunition in the drum, a signal is sent to the gun control unit in time to cut off power. The device prevents spent ammunition from being chambered in the gun, and as a result also permits higher rates-of-fire by the gun. (Author)

19G. Rockets

AD-B010 158/4 PC **A04**/MF **A01**
Hughes Aircraft CO Canoga Park Calif Systems Design Lab
Supersonic Rocket Launcher.
Final rept. 17 Jun 74-21 Feb 75,
E. P. Lowe, and R. D. Stubbs. Mar 75, 73p
AFATL-TR-75-58
Contract F08635-74-C-0153
Distribution limitation now removed.

A prototype, low cost, lightweight, supersonic rocket launcher was designed and fabricated. The launcher carries eighteen 2.75-inch folding fin aircraft rockets and is designed to withstand the loading caused by supersonic carriage on an aircraft. The launcher features a lightweight composite structure consisting of a foam encapsulated, integrally bonded aluminum launch tube matrix in combination with a fiber reinforced epoxy laminated structural suspension system and outer skin. The launcher has three separate and removable sections to facilitate maintenance and replacement of worn or damaged components. The forward section consists of the launch tube matrix and aerodynamic nose shape. The middle section contains the detents, electrical contacts, and intervalometer. The aft section is an aerodynamic base fairing. This program was the first attempt within the United States to fabricate a supersonic rocket launcher, and the technology developed on this program will be applicable to future developmental programs for advanced rocket launchers.

20. PHYSICS

20A. Acoustics

AD-A079 562/5 PC **A12**/MF **A01**
Woods Hole Oceanographic Institution MA
Attenuation of Low Order Modes in Lossy Acoustic Wave Guides.
Technical rept.,
Harold David Leslie. Dec 79, 263p Rept no. WHOI-79-91
Contract N00014-75-C-0852

Acoustic propagation is treated for sound sources in an ocean bounded from below by stratified layering. The bounding layers of the waveguide may be homogeneous-isovelocity or inhomogeneous with vertical sound speed gradients. The layers may be dissipative or nondissipative. The acoustic field is described with a normal mode expansion and modal attenuation coefficients are calculated for low order modes as a function of mode number and either frequency or phase velocity. The theoretical basis of the calculations is presented for multilayer isovelocity guides and for multilayer guides with index or refraction squared varying linearly with depth. Numerical results are presented for the Pekeris model of a fluid layer over a dissipative fluid halfspace. A comparison is made between various attenuation coefficients proposed in the literature. (Author)

AD-A079 622/7 MF **A01**
Federal Aviation Administration Washington DC Office of Environment and Energy
INM Integrated Noise Model Version 2. Programmer's Guide,
Thomas Connor, and Robert Hinckley. Sep 79, 129p Rept no. FAA-AEE-79-10
Contract DOT-PPA-FA-865
Supersedes Rept. no. FAA-EQ-78-03.
Availability: Microfiche copies only.

This document contains information on the procedures to implement the Integrated Noise Model (INM), Version 2 on to a computer system. The INM is a collection of computer programs which can calculate the aircraft noise environment in the vicinity of an airport. The INM is available from the FAA in the form of a magnetic tape. INM Version 2 supersedes Version 1 which was released in January 1978. This document replace 'FAA Integrated Noise Model, Version 1, Computer Installation Instructions' (Report No. FAA-EQ-78-03). (Author)

AD-A079 628/4 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Sound Absorption in Sea Water by a Third Chemical Relaxation.
Summary rept.,
F. H. Fisher. 21 Aug 78, 11p Rept no. MPL-U-28/77
Contract N00014-75-C-0749, Grant NSF-OCE76-02253
Pub. in Jnl. of the Acoustical Society of America, v65 n5 p1327-1329 May 79.

No abstract available.

AD-A079 661/5 PC **A06**/MF **A01**
Texas Univ At Austin Applied Research Labs
The Effect of Sediment Rigidity on Bottom Reflection Loss.
Technical rept.,
Paul J. Vidmar. 19 Sep 79, 105p Rept no. ARL-TR-79-49
Contract N00014-78-C-0113

The plane wave reflection coefficient R of a horizontally stratified ocean bottom is studied for typical deep sea sediment types in order to determine the importance of sediment rigidity (shear wave propagation) on bottom reflection loss, RL=-20 log(absolute value of R) dB. The emphasis is on, but not restricted to, low grazing angles (0 to 45 deg) and low frequencies (10 to 200 Hz). R is studied using a computational model accurate for frequencies above 10 Hz which treats a single inhomogeneous (solid) sediment layer overlying a homogeneous (solid) substrate. An examination of the reflection and transmission coefficients at the water-sediment and sediment-substrate interfaces, by means of an expansion in the ratio of sediment shear speed to the sound speed in water, reveals the mechanism for exciting sediment shear waves and provides an understanding of the empirical separation into 'thick' and 'thin' sediments. At the water-sediment interface sediment shear waves are not efficiently excited and the sediment can be treated, in most cases, as a fluid. The dominant mechanism for exciting sediment shear waves is compressional wave conversion at the sedimen t-substrate interface. At a given grazing angle in a thick sediment the compressional wave will have a turning point well above the sediment-substrate. Compressional wave amplitude at the interface will be small.

AD-A079 670/6 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Correlation between Acoustic Scatterers and Temperature Gradient.
Summary rept.,
G. Thomas Kaye. 26 Jun 78, 15p Rept no. MPL-U-24/78
Contract N00014-75-C-0749
Pub. in Jnl. of Marine Research, v37 n2 p319-326 1979.

No abstract available.

AD-A079 671/4 PC **A02**/MF **A01**
Scripps Institution of Oceanography San Diego CA Marine Physical Lab
Acoustic Target Strengths of Marine Organisms.
Summary rept.,
John D. Penrose. 5 Jul 78, 13p Rept no. MPL-U-33/78
Contract N00014-75-C-0749
Pub. in Jnl. of the Acoustical Society of America, v65 n2 p374-380 Feb 79.

No abstract available.

AD-A079 696/1 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Cruise Report for USNS De steiguer Operations in OUTPOST GUMBO.
Final rept.,
Rockne S. Anderson. Jun 79, 30p Rept no. NORDA-TN-48

OUTPOST GUMBO was an underwater acoustic research operation at four sites in the northeastern Pacific conducted in August 1978. Participants included members from the Naval Ocean Research and Development Activity (NORDA), Defence Research Establishment (DREP), and the Naval Air Development Center (NADC). Platforms used were USNS DESTEIGUER, CFAV ENDEAVOUR, CFAV ST. ANTHONY, and two CFVP-407 ARGUS aircraft. Data were collected for acoustic bottom interaction, signal excess, and ambient noise, as well as environmental geologic and oceanographic data. Arrays were used as receivers: VEKA (NORDA), TSVLA (NADC), and MEVA (DREP). This report discusses operations, quantity and quality of collected data, and associated problems as related to NORDA's participation on board USNS DESTEIGURE. (Author)

AD-A079 824/9 Not available NTIS
Texas A and M Univ College Station Dept of Oceanography
Mesoscale Variations in the Deep Sound Channel and Effects on Low-Frequency and Propagation,
William J. Emery, Thomas J. Reid, John A. DeSanto, Ralph N. Baer, and John P. Dugan. 26 Jul 78, 11p
Availability: Pub. in Jnl. of Acoustical Society of America, v66 n3 p831-841 Sep 79 (No copies furnished by DTIC).

No abstract available.

AD-A079 916/3 PC **A04**/MF **A01**
Battelle Columbus Labs OH
A Software Package for Estimating Time Differences for Artillery Sound Ranging Applications.
Technical rept.,
Lonnie C. Ludeman. Nov 79, 52p ERADCOM/ASL-CR-79-0100-6
Contract DAAG29-76-D-0100
Prepared in cooperation with New Mexico State Univ., Las Cruces.

The Fortran program entitled 'Time Differences Estimator Program' is presented and documented. The program will accept a given number of microphone signals each containing a specified number of data points from a fixed data format and determine the time differences between signal bursts

that appear within the record length. It also gives a measure of reliability to associate with the time differences and provides, through a least square error procedure, a consistent set of relative times that can be used as input data to a position estimator. Results from using the program on a number of recorded signals from C4 explosions approximately 12 km away are presented showing target location errors of approximately 200 meters. (Author)

AD-A080 038/3 MF **A01**
Naval Underwater Systems Center New London CT New London Lab
CONVOL: A Computer Program for Parametric Source Nearfield and Farfield Beam Patterns.
Technical memo.,
Mark B. Moffett, and Robert H. Mellen. 17 Jul 79, 47p Rept no. NUSC-TM-791132
Availability: Microfiche copies only.

Because it is often impractical to make measurements in the farfield of parametric acoustic sources, it is desirable to be able to predict the farfield from the nearfield measurements. A nearfield beam pattern theory, previously outlined (J. Acoust. Soc. Am. 63, 1622-1624 (L) (1978)), has been programmed for digital computation. The results compare favorably with experimental data from an absorption-limited source involving substantial difference-frequency generation in the primary farfield and from a saturation-limited source with most of the generation taking place in the primary nearfield. In the first example, the nearfield beam pattern is broader and the apparent source level is lower than in the farfield. In the second example, the nearfield pattern is narrower and the apparent source level higher than in the farfield. (Author)

PATENT-4 176 339 Not available NTIS
Department of the Navy Washington DC
Propagation Sampled Acoustic Line Array.
Patent,
William L. Konrad. Filed 2 Feb 78, patented 27 Nov 79, 5p AD-D006 870/0, PAT-APPL-874 453 Supersedes PAT-APPL-874 453-78, AD-D004 824.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses an acoustic line array which includes a co-axial cable having a center conductor surrounded by a flexible material of low-electrical conductivity. The flexible material is surrounded by a conducting material protected by an external shield. The cable has characteristic impedance which is sensitive to pressure variations in the medium due to a traveling acoustic pressure wave from an acoustic source. Variations in the impedance of the array are used to detect the acoustic source. Alternatively, the line array makes use of the discrete sensors placed at suitable intervals along the array. This type of acoustic array eliminates the use of a plurality of wires carrying the electrical signals from the transducer to the storage equipment and elaborate multiplexing techniques. (Author)

PATENT-4 178 577 Not available NTIS
Department of the Navy Washington DC
Low Frequency Hydrophone.
Patent,
Hector J. Cini, and Theodore J. Meyers. Filed 6 Feb 78, patented 11 Dec 79, 5p AD-D006 876/7, PAT-APPL-875 056
Supersedes PAT-APPL-875 056-78, AD-D004 823.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pressure-balanced hydrophone having a low cut-off frequency which includes a pair of piezo-ceramic tubes, wired in series, and having one end of each tube secured to a metal block in the center. The second end of one of the ceramic tubes is covered by means of a solid metal end cap and the second end of the other ceramic tube is covered by a porous sintered metal end cap. The unit is enclosed in an elastomeric cylindrical boot which is closed at the open end by a metallic disc. A pair of fill plugs are provided to fill the interior and the exterior of the piezo-ceramic tubes with a suitable oil. The unique feature of subject device is that a plurality of pores in the porous sintered metal end cap act as a plurality of capillaries for pressure balancing and thus make the hydrophone insensitive to hydrostatic pressure variations. (Author)

20C. Electricity and Magnetism

AD-A079 575/7 PC **A02**/MF **A01**
Duke Univ Durham NC Dept of Physics
Excitation of a Spherical Resonant Medium by an External Field,
D. Dialetis. 4 Dec 78, 11p ARO-14729.7-P
Grant DAAG29-77-G-0016
Pub. in Jnl. of the Optical Society of America, v69 n6 p882-891 Jun 79.

No abstract available.

20D. Fluid Mechanics

AD-A079 539/3 Not available NTIS
Florida State Univ Tallahassee Geophysical Fluid Dynamics inst
Some Predictions from the Mean-Field Thermosolutal Equations,
N. Riahi. 29 Jan 76, 12p
Contract N00014-67-A-0235-0008
Availability: Pub. in Jnl. of Fluid Mechanics, v87 pt4 p737-748 1978 (No copies furnished by DTIC).

No abstract available.

AD-A079 619/3 PC **A03**/MF **A01**
New York Univ NY Dept of Applied Science
Nonlinear Wave Process Hierarchies and the Cyclic Development of Quasi-Ordered Structures in Turbulent Shear Flows.
Final rept. 1 Jul 77-30 Jun 79,
Roberto Vaglio-Laurin. Nov 79, 36p NYU/DAS-79-18, AFOSR-TR-79-1322
Contract F49620-77-C-0119

The nonlinear wave interpretation and description of the large scale coherent structures commonly observed in free as well as bounded turbulent shear flows has been discussed. The experimentally observed cyclic development of nonlinear two-dimensional vorticity concentrations in homogeneous, incompressible, free mixing layers has been linked to the growth/equilibration of finite amplitude, spatially amplifying instabilities and their cyclic regeneration under the action of intrinsic secondary instabilities evoked by flow nonlinearity. The mathematical modeling of such nonlinear behavior in terms of matched asymptotic expansion solutions of the Navier Stokes equations, being reported under separate cover, has been reviewed. The relevance of the physical viewpoint and the mathematical model to more general turbulent flows has been examined and supported by an analysis of selected, conditionally sampled, measurements in transitional and turbulent boundary layers. On that basis, a dominant role of specific nonlinear wave processes has been indicated, and the approach to their systematic mathematical modeling from first principles has been outlined. (Author)

AD-A079 634/2 PC **A07**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
Studies of the Statistical Bias and Signal Characteristics of Laser Velocimeters.
Final rept. Jul 76-Sep 77,
D. O. Barnett, and T. V. Giel, Jr. Jan 80, 148p Rept no. AEDC-TR-78-65
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Analyses are presented of (1) the statistical bias individual realization laser velocimeters (LV's) and (2) the theoretical signal amplitudes obtained from dual-scatter (fringe) LV's. The analyses are compared to experimental data obtained from a subsonic, confined, seeded jet. The statistical bias study reviews the various formulations relating LV sampling characteristics to the velocity field and shows that, theoretically, bias is reduced by random sampling, introduction of fixed-time delays between samples, and nonuniformities in seeding. These concepts are tested by a bias simulation program which simulates LV response to a turbulent flow by applying various sampling laws to hot-wire anemometer data. The finite-difference algorithms suggested by various investigators to eliminate bias from LV data fail if the sampling rate is less than the local integral time scale of the turbulent flow. Velocity data for the near field of a uniformly seeded subsonic jet exhausting into a plenum were obtained by pitot probes, hot-wire anemometers, and a Bragg-diffracted laser velocimeter. No consistent bias of the data was observed, indicating that routinely correcting LV data for statistical bias may lead to significant errors.

AD-A079 641/7 PC **A04**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Relation of the One-Phase Stefan Problem to the Seepage of Liquids and Electrochemical Machining,
Joel C. W. Rogers. Dec 79, 52p Rept no. APL/JHU-REPRINT-2169
Contract N00014-79-RC-90009

The flow of water through a dam of fairly arbitrary shape is examined in the limit of large frictional drag on the flow. The relation of the problem to the one-phase Stefan problem and a problem of anodic smoothing is explored. Monotonicity and uniqueness results for the solution of the time-dependent problem are obtained. Numerical solution of the time-dependent problem is considered. Algorithms to treat the steady state problem are studied in detail. (Author)

AD-A079 642/5 PC **A02**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
The Formulation of Selected Free Boundary Problems as Conservation Laws,
Joel C. W. Rogers. Dec 79, 15p Rept no. APL/JHU-REPRINT-2173
Contract N00014-79-RC-90009

Some free boundary problems are written as conservation laws. Numerical algorithms conserving the necessary quantities are discussed. Suitable function spaces are mentioned. Formal extensions of the algorithms to systems are proposed. Analytic difficulties in the solution of systems in higher spatial dimensions are suggested. (Author)

AD-A079 718/3 PC **A06**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Finite-Amplitude Solitary Water Waves.
Technical summary rept.,
C. J. Amick, and J. F. Toland. Oct 79, 118p Rept no. MRC-TSR-2012
Contract DAAG29-75-C-0024

This paper considers the existence problem for solutions of the free boundary value problem which arises from the question of the existence of solitary gravity waves, moving without changes of form, and with constant velocity, on the surface of ideal fluid in a horizontal canal of finite depth. The analysis imposes no restriction on either the slope or the amplitude of the wave, and we prove that there exists a connected set of solitary waves containing waves of all slope between 0 and pi/6. It is then proved that each of these solitary waves has finite mass, and, as a consequence, that $F > 1$, where F is the Froude number. This, in turn, tells us that the solitary wave decays faster than exp(-alpha abs.val.(x/h), where alpha is an element or (0, alpha-bar) and 1/alpha-bar tam(alph-bar) = 1-squared. Finally, it is shown that, in a certain limit, these solitary waves converge to a solitary stokes wave of greatest height, and the validity of stokes' conjecture for solitary waves is considered, but not resolved. (Author)

AD-A079 858/7 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Numerical Study of Normal-Shock/Turbulent Boundary Layer Interactions.
Master's thesis,
Lowell C. Keel. Dec 79, 77p Rept no. AFIT/GAE/AA/79D-8

The hybrid finite difference code developed by MacCormack was applied to the investigation of

transonic normal-shock turbulent boundary layer interactions. The computations were performed for the half plane of a symetric two dimensional duct by establishing a symmetry boundary condition at the upper boundary. Both first and second order center line boudnary conditions were imposed with no measurable difference observed. A two-point linear extrapolation of the primative variable was unsuccessfully attempted at the subsonic outflow boundary, but a simple zero gradient condition gave satisfactory results at four different outflow boundary positions relative to the shock wave. Numerical results (M = 1.51, 1.40 and 1.3 Re = 3,000,000 per ft) were compared with the experimental data reported by Abbiss and East. Even though the data exhibit three-dimensional effects, the two-dimensional computations show agreement within approximately 10%. The differences observed in the numerical-experimental comparisons were all consistent with expected three-dimensional trends. Although not conclusive, the potential of adding simple three-dimensional corrections to the two-dimensional code shows promise for improving the experimental-numerical agreement. (Author)

AD-A079 876/9 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Calibration of the Preston Tube in Liquid Flow Systems.
Master's thesis,
Brian A. Maher. Dec 79, 77p Rept no. AFIT/GAE/AA/79D-10

The justification of Preston tube usage is based on a universal similarity law that relates the velocity profile in fully developed pipe flow to that of a boundary layer associated with external flow. The Preston tube measures these velocities at the wall and when calibrated for flow in a pipe, provides a means of determining the local wall shear stress. This study is intended to extend the validity of this method to other working fluids such as liquids. Four separate size Preston tubes are used in three different experiments. The oil pipe provided a unique fluid in a narrow bore pipe and encompassed Reynolds numbers from just turbulent flow to 11600. Results indicated a calibration for oil that closely matched established air data. In the water tunnel experiment some difficulty was encountered for low speed flow but results above Re = 12800 precisely matched that for air. Each tube tested provided similar data and effectively proved the validity of Preston's method for water.

AD-A079 880/1 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Holographic Interferometric Survey of Boundary Layer Transition in an Axisymmetric Free Convection Thermal Boundary Layer.
Master's thesis,
Gregory S. Meserve. Dec 79, 72p Rept no. AFIT/GAE/AA/79D-12
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Unique optical data from the laminar and transition regions of an axisymmetric free convection thermal boundary layer are presented. The boundary layer encompasses a vertically oriented right circular cylinder kept at a constant wall temperature and suspended in a quiescent air environment. Pulse laser holographic interferometry was used to obtain a measurement of the temperture distribution through the boundary layer. Schlieren methods are used to photograph the boundary layer to provide a qualitative description of the transition region. An approach is outlined to find an approximate numerical solution for the temperture distribution through the boundary layer. Intergral equations are developed for a differential control volume within the boundary layer after which assumed velocity and temperature distributions are used to reduce the intergral equations to first order non-linear differential equations. The differential equations are non-dimensionalized and numerical techniques are used in an attempt to obtain a solution. Quantitative data from the laminar region resulted in a discrepancy between theoretical and experimental evaluation of a local Nusselt number. Qualitative observation of the transition region reveals a fringe reversal phenomena that could possibly be associated with the fundamental mechanisms of transition. (Author)

AD-A079 888/4 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
Particle Diagnostics Using Mie Scattering and Image Intensification Techniques.
Final rept. Aug-Oct 78,
R. L. McGuire, J. W. L. Lewis, D. P. Weaver, and B. P. Curry. Jan 80, 36p Rept no. AEDC-TR-79-42
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with ARO, Inc. Tullahoma, TN.

The visualization of a particulate-laden flow field immersed within a hypersonic flow has been achieved using Mie scattering. The visualization technique employed the injection of a modulated laser beam which was expanded to provide observation of a broad spatial region of the particulate plume. The Mie scattered radiation was detected by an image intensifier tube, the output of which was detected by a fast-framing camera. A description is provided of this system, the analysis of the data, and the results. (Author)

AD-A079 890/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Stability of Self-Similar Flow. 6. Uniform Implosion of an Ablatively Driven Shell.
Memorandum rept.,
David L. Book, and Ira B. Bernstein. 17 Dec 79, 34p NRL-MR-4132, AD-E000 350

The linear stability of a uniformly imploding shell, modeled as an ideal polytropic fluid, is investigated. Two types of unstable modes are found: incompressible irrotational perturbations localized at the outer surface, ascribable to Rayleigh-Taylor instability, and compressible modes, associated with convective instability. KIDDER'S (1976) result for the Rayleigh-Taylor modes is shown to hold independently of the form of the shell density profile. By means of a variational principle it is shown that the criterion for convective instability is the existence of a region within which the differential of p times rho to the negative gamma power in respect to r>0. Analytic solutions for both spatial and temporal dependence of the perturbations are presented, and the results applied to pellets imploded by the action of a laser or charged-particle beam. (Author)

AD-A080 066/4 PC **A05**/MF **A01**
Ford Aerospace and Communications Corp Newport Beach CA Aeronutronic Div
Transition to Turbulence in Free Shear-Layers.
Final rept. Oct 74-Oct 79,
A. Demetriades. Oct 79, 80p U-6573, AFOSR-TR-80-0056
Contract F44620-75-C-0016

Part I of this report presents an investigation of the transition to turbulence in free shear layers. A theoretical analysis is performed to drive a formula for predicting transition, based on the novel approach used earlier by the same investigators to predict transition in wakes and boundary layers. The formula so derived shows that the transition Reynolds number increases as the non-dimensional velocity ratio decreases, and also as the fast side Mach number and slow side total temperature are increased. An experiment to test the theory was performed; together with earlier transition data, the new data provide good support for the theory. However, a strong dependence of the transition Reynolds number on unit Reynolds number characterizes the available data, whereas the theory does not predict such dependence. In Part II of this report a brief account is given on the measurement of temperature fluctuations in a cooled compressible turbulent wake. The results endorse the novel detection technique utilized, and support theoretical predictions made earlier under this contract. (Author)

AD-B017 944/0 PC **A06**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
A Finite Element Mach Box Procedure for Flutter Predictions of Panels in Three-Dimensional Supersonic Unsteady Potential Flow.
Final rept. Jun-Dec 76,
T. Y. Yang. Dec 76, 103p Rept no. AFFDL-TR-76-161
Distribution limitation now removed.

A finite element formulation and solution procedure are developed for flutter predictions of rectangular panels with one surface exposed to three-dimensional supersonic unsteady potential flow. The effect of in-plane force is included. Each element is divided into several Mach boxes. The aerodynamic influence coefficients between each pair of sending and receiving boxes are computed by the method of Gaussian quadrature. The aerodynamic matrix is based on the numerically computed velocity potentials for all boxes.

N80-16298/5 PC **A03**/MF **A01**
Stanford Univ., CA.
Evolution of Weak Disturbances in Inert Binary Mixtures.
M. L. Rasmussen. Aug 77, 32p NASA-TM-80925, SU-JIAA-TR-6
Subm-Sponsored in Part by NASA.

The evolution of weak disturbances in inert binary mixtures is determined for the one-dimensional piston problem. The interaction of the dissipative and nonlinear mechanisms is described by Burgers' equation. The binary mixture diffusion mechanisms enter as an additive term in an effective diffusivity. Results for the impulsive motion of a piston moving into an ambient medium and the sinusoidally oscillating piston are used to illustrate the results and elucidate the incorrect behavior pertaining to the associated linear theory.

N80-16300/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Turbulence Measurements in the Boundary Layer of a Low-Speed Wind Tunnel Using Laser Velocimetry.
E. T. Schairer. Feb 80, 25p NASA-TM-81165, A-8058

Laser velocimeter measurements in an incompressible, turbulent boundary layer along the wall of a low-speed wind tunnel are presented. The laser data are compared with existing hot-wire anemometer measurements of a flat plate, incompressible, turbulent, boundary layer with zero pressure gradient. An argument is presented to explain why previous laser velocimeter measurements in zero pressure gradient, turbulent boundary layers have shown an unexpected decrease in turbulent shear stresses near the wall.

20E. Masers and Lasers

AD-A079 579/9 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
The Dye Laser and Laser with a Saturable Absorber: A Comparison of the Time-Dependent Density Matrix Equations.
Rajarshi Roy. 21 Mar 79, 6p AFOSR-TR-79-1291
Grant AFOSR-76-2918
Pub. in Optics Communications, v30 n1 p90-94 Jul 79.

No abstract available.

AD-A079 595/5 PC **A02**/MF **A01**
Colorado State Univ Fort Collins Dept of Electrical Engineering
Kinetic Rate Constants for Mercury Halide Lasers.
Interim technical rept.,
George J. Collins. 29 Oct 79, 14p
Contract N00014-78-C-0266, ARPA Order-2840

This research is directed towards the measurement of total quenching rates for the Hg(6s6p) levels with a variety of chlorine and bromine halogen bearing molecules. This information is important to the development of more efficient mercury halide lasers. The objectives are to identify optimum halogen donors for all three lasers HgBr, HgCl, and HgI. An attempt has been made to pump these blue-green lasers in a more conventional technique, such as flash lamp pumping. Research is continuing to uncover other blue-green laser systems through photodissociation and optical pumping of metal halides. (Author)

AD-A079 596/3 PC **A02**/MF **A01**
National Bureau of Standards Washington DC Quantum Chemistry Group

Theoretical Studies of Electronic Transition Lasers.
Annual rept. for FY 1979,
Morris Krauss, and Walter J. Stevens. 1979, 7p
Contract N00014-79-F-0043

Self-absorption in electronic transition lasers can severely limit the efficiencies of such systems. We identified a bound-continuum X-A as well as possible bound-bound transitions which could absorb at the B-X lasing energy in Group II b-halides. Figure 1 shows the bound-continuum absorption transition for HgCl. Experimental evidence for these transitions is non-existent and ab initio calculations are required to obtain the spectroscopic properties of these systems. We can note parenthetically that the determination of the energies and spectroscopic properties of excimer and ion-pair type electronic transition lasers has relied heavily on ab initio calculation. A well-defined calculation scheme has been developed which is applicable over the entire periodic table. Relativistic -dependent pseudopotentials have been used in the calculation of the electronic structure and transition moments of HgCl. Compact but accurate bases have been determined variationally at the double zeta plus polarization level. The final wave functions, energies, and properties have been obtained at the first-order configuration interaction level of accuracy. Because pseudopotentials are used, the paraphanelia of computing the wavefunctions such as trial inputs and configuration interaction formula tapes are identical for all Group II b-halides, which would permit straight-forward extension of the HgCl results.

AD-A079 797/7 PC **A06**/MF **A01**
Defense Intelligence Agency Washington DC
Bibliography of Soviet Laser Developments, Number 39, January - February 1979.
Nov 79, 121p Rept no. DIA-DST-1740Z-007-79
See also AD-A075 784.

This is the Soviet Laser Bibliography for January-February 1979 and is no. 39 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; beam-target interaction; and plasma generation and diagnostics. (Author)

AD-A079 879/3 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Shock Induced Starting of Gasdynamic Laser Nozzles.
Master's thesis,
Paul Allen Weber. Dec 77, 103p Rept no. AFIT/GAE/AA/79D-18

Dynamic processes occurring in single and multiple arrays of contoured Mach 3.2 rapid expansion, two-dimensional, supersonic nozzles during the passage of strong shock waves were investigated. Two sizes of single throat nozzles were tested. Their throat openings were 0.276 and 0.069 inch. The multiple nozzle array used had nine parallel nozzles of the smaller size arranged to simulate the flow channel of a gas dynamic laser. Several series of schlieren photographs were taken of the flow field within the nozzles. A fully started condition evidenced by uniform supersonic flow was observed in the small single nozzle and the multiple throat array approximately 80 microseconds after the passage of Mach 2.33 shock waves. The large single nozzle was not fully started by Mach 3.0 incident shocks. The dynamic flow initiation process was found to be strongly influenced by the strength and frequency of transverse wave reflections in the nozzle inlets. The larger single nozzle's failure to start is believed to be due to the fact that its larger inlet size reduced the frequency of these reflections by an amount which prevented the rapid increase in effective reservoir pressure necessary for supersonic flow initiation. A novel digital time delay computer was designed and built to facilitate making closely spaced photographs of the flow patterns.

AD-A079 891/8 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Light Distribution Near the Line Focus in A HSURIA Laser Resonator.
Interim rept.,
William H. Carter. 24 Dec 79, 13p NRL-8347, AD-E000 352
ARPA Order-3529

The intensity distribution about the line focus inside a HSURIA resonator is obtained theoretically and used to study the gas break-down problem for high-energy lasers.

AD-A079 904/9 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Separation Control in the ALL APT Light Pipe.
Master's thesis,
Wade H. Bailey, Jr. Dec 79, 92p Rept no. AFIT/GAE/AE/79D-1

An experiment was performed to determine separation regions inside a high energy laser (HEL) beam relay light pipe. The pipe is part of the beam relay system used in conjunction with the CO2 Gas Dynamic Laser (GDL) system under development by the Air Force Weapons Laboratory. It was found that the air flowing through the pipe separated at the elbows. This separation can cause uneven radial heating attributed to molecular absorption. The self-induced thermal distortion of the beam can cause phase distortions degrading the beam. A study of separation control systems within the pipe was made. A full-scale axisymmetric model was studied on the water table. Areas of separation were found by flow visualization using dye injection. A brief evaluation of suction and blowing to control separation showed both of these methods acceptable. Separated regions discovered at each elbow on the water table were the focus of study for a full-scale air flow plexiglass model. The turbulent flow in the pipe was studied using smoke injection to reveal air motion in the pipe. Mass flow rates of air through the pipe were 1 lb/min and 8 lbs/min. Suction and blowing were assessed as flow separation control methods.

AD-A079 926/2 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Behavior of Alkali Halides as Materials for Optical Components of High Power Lasers,
Ileana D. Apostol, V. Ghiordanescu, I. N. Mihailescu, Leona C. Nistor, and S. V. Nistor. 30 Mar 79, 32p Rept no. FTD-ID(RS)T-0282-79
Edited trans. of Studii si Cerectari de Fizica (Romania) v30 n6 p601-618 1978, by Mina Winters.

No abstract available.

AD-A079 938/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Action of the Large Doses of Gamma Irradiation on the Properties of Laser,
U. A. Arifov, M. R. Bedilov, and K. Khaydarv . 27 Aug 79, 10p Rept no. FTD-ID(RS)T-1118-79
Unedited machine trans. of Doklady Akademii Nauk UZSSR (USSR) N8 p22-24 1970.

No abstract available.

AD-A079 964/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
An Analysis of Parameters of a Gas-Dynamic Laser Utilizing Acetylene Combustion,
Michael Syczewski, and Janusz Rutkowski. 25 Jul 79, 21p Rept no. FTD-ID(RS)T-0901-79
Edited trans. of Archiwum Termodynamiki i Spalania (Poland) v8 n3 p459-469 1977.

No abstract available.

AD-A079 977/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
An Analysis of the Parameters of a Gas-Dynamic Laser with the Acetylene Combustion,
Michal Syczewski. 28 Sep 79, 21p Rept no. FTD-ID(RS)T-1251-79
Edited trans. of Archiwum Termodynamiki i Spalania (Poland) v8 n2 p287-295 1977.

No abstract available.

AD-B015 026/8 PC **A04**/MF **A01**
United Technologies Research Center East Hartford Conn
Three to Five Micron VET Laser Investigation.
Final rept. 2 Jan-31 Dec 75,
John A. Shirley. Sep 76, 58p UTRC-R75-952051-13, AFAL-TR-76-57
Contract F33615-75-C-1047
Distribution limitation now removed.

The objective of this investigation is to develop and demonstrate the technology necessary to design a practical airborne molecular vibration-vibration energy transfer laser operating in the 3 to 5 micrometers spectral range with an output of 10-100 watts. The deuterium-donor/hydrogen chloride-acceptor system has been selected as the most promising transfer system in the given spectral region. Spectroscopic measurements have been made in flowing HCl vibrationally excited by transfer from deuterium excited in a self-sustained dc electric discharge. The medium is characterized by a vibrational temperature, which is T sub V = 1440-1960 K and rotational temperature, which is T sub V = 240-325 K immediately after mixing and transfer. Donor gas excitation determined by Raman scattering in the hydrogen isotope corresponds to T sub V = 900-1350 K. Calorimetric measurements of electric discharge heat losses have confirmed the relatively low level of discharge vibrational excitation. Attempts to determine post discharge dissociation have been negative. (Author)

AD-B015 176/1 PC **A06**/MF **A01**
Gte Sylvania Inc Mountain View Calif Electro-Optics Organization
Solar Pumped Laser.
Final technical rept. 18 Feb 74-11 Jul 75,
Joseph D. Taynai. Sep 76, 112p AFAL-TR-75-191
Contract F33615-74-C-1062
Distribution limitation now removed.

The objective of the work described in this report was the demonstration and delivery of a mode-locked, frequency doubled, conductively cooled, solar pumped laser, designed to prototype space qualifiable level and structurally compatible with the EFM lamp pumped laser developed under AF contract No. F33615-74-C-1028. The laser was required to provide a minimum of 250 mW of 0.53 micrometers radiation, mode locked at an average prf of 500 MHz with a pulse width of less than 300 ps. The laser actually produced 400 mW with 280 ps pulses with a Nd:Cr:YAG laser rod. Maximum power was 480 mW with 560 ps pulses. (Author)

AD-B017 604/0 PC **A04**/MF **A01**
Ilc Technology Inc Sunnyvale Calif
Laser Pump Lamp.
Final technical rept. Dec 74-Oct 75,
Norman C. Anderson. Feb 77, 60p R-ILC-75-2/F, AFAL-TR-76-66
Contract F33615-75-C-1080
Distribution limitation now removed.

A program was conducted to continue development of a potassium-rubidium arc lamp for laser pumping. The average useful lifetime of such lamps was significantly increased, primarily as the result of improved lamp end seal technology. Lifetimes of nickel and Kovar endcap lamps built at the end of the program were typically in the 600-1000 hour range. The primary lamp failure mode was basal plane cleavage cracking of the sapphire envelopes. Difficulty in obtaining good CVD niobium-to-sapphire seal assemblies from outside suppliers hampered development work on the alternative protected end seal lamp design. One lamp was life tested, failing at 182 hours. Experiments on laser pumping efficiency were conducted. Efficiency was found to be roughly proportional to the potassium:rubidium ratio in the lamp fill. Four millimeter bore lamps were found to be more efficient than standard five millimeter bore lamps. (Author)

AD-B020 481/8 PC **A04**/MF **A01**
Perkin-Elmer Corp Norwalk Conn
Long Life Nd:YAG Laser Device.
Final rept. 17 Mar 75-18 Mar 76,
David A. Huchital. May 77, 69p PE-12985, AFAL-TR-76-110
Contract F33615-75-C-1193
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

The developed electrodeless lamp is compatible with conductive cooling. It has been demonstrated

that the life of such a lamp has been greater than 1000 hours of operation. Furthermore, it has been demonstrated that an output of one watt multimode at 1.06 micron can be achieved for an input of 215 watts of RF power to the lamp. (Author)

AD-B023 873/3 PC **A03**/MF **A01**
Calspan Corp Buffalo N Y
Hydroxyl Radical Chemical Laser.
Final rept. 2 Jul 75-2 Feb 77,
J. W. Daiber, J. W. Raymonda, and H. M. Thompson. Nov 77, 32p CALSPAN-WG-6096-A-1, NWC-TP-5938
Contract N00123-75-C-0685
Distribution limitation now removed.

The reaction of H-atoms with O3 is known to result in the product molecule OH being in the ninth vibrational level. Such a high level of chemiexcitation could result in chemical laser action. The motivation for developing such a laser is (1) the wavelength at which lasing would occur has good atmospheric transmission, and (2) the reactants and products can be handled safely. In the present program, techniques were developed for generating large fluxes of H-atoms and O3-molecules. An apparatus was constructed for the demonstration of lasing; however, full testing could not be completed in this program. Lasing was not achieved. (Author)

PATENT-4 185 254 Not available NTIS
Department of the Air Force Washington DC
Annular Laser Having Adjustable and Interchangeable Laser Windows.
Patent,
Lawrence H. Hall, and John R. Novak. Filed 13 Oct 77, patented 22 Jan 80, 5p AD-D006 845/2, PAT-APPL-841 879
Supersedes PAT-APPL-841 879-77, AD-D004 487.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses an annular laser having an elongated centrally located flashlamp enclosed in a quartz tube as well as adjustable and interchangeable laser windows. The position of the flashlamp produces a gain region with a smoothly varying radial intensity distribution with uniform azimuthal output. The mechanism which permits adjustment and interchangeability of the laser windows allows the invention to be utilized as a useful tool in the study of annular optics. (Author)

20F. Optics

AD-A079 535/1 Not available NTIS
Society of Photo-Optical Instrumentation Engineers Bellingham WA
Laser Inertial Rotation Sensors,
Shaoul Ezekiel, and G. E. Knausenberger. 1978, 234p
Availability: Pub. in SPIE, v157 p1-226 1978 (No copies furnished by DTIC).

No abstract available.

AD-A079 576/5 PC **A02**/MF **A01**
City Coll New York Dept of Physics
Continuous Fourier-Transform Spline Solution of Unstable Resonator-Field Distribution,
M. Lax, G. P. Agrawal, and W. H. Louisell. 11 May 79, 5p ARO-13410.18-P
Grant DAAG29-76-G-0055
Pub. in Optics Letters, v4 n9 p303-305 Sep 79. Prepared in cooperation with University of Southern California, Los Angeles. Dept. of Physics, and Bell Telephone Labs., Inc., Murray Hill, NJ.

No abstract available.

AD-A079 616/9 PC **A02**/MF **A01**
Texas Tech Univ Lubbock Optical Systems Lab
Space-Variant Optical Systems.
Final rept. 30 Jun 75-30 Sep 79,
John F. Walkup. Nov 79, 15p AFOSR-TR-79-1316
Grant AFOSR-75-2855

This report summarizes the results of analytical and experimental investigations of both two-dimensional and one-dimensional coherent optical processors for performing space-variant operations. The two dimensional processors have generally used multiplex holography as an approach to implementing a sampling theorem-based representation of the optical system of interest. The one-dimensional processors are variations of a generalized 1-D processor which has been shown to have a variety of applications. (Author)

AD-A079 625/0 PC **A04**/MF **A01**
Hughes Research Labs Malibu CA
Fiber Optic Couplers.
Interim rept. 1 Aug 78-31 May 79,
C. K. Asawa. Nov 79, 74p RADC-TR-79-263
Contract F19628-78-C-0201

The purpose of this contract is to conduct research and development of new fabrication techniques for couplers for use with single strand multimode optical fiber waveguides. The structures investigated under this contract were directional couplers and 8 by 8 planar transmission star couplers. Both theoretical and experimental characterization of the 8 by 8 transmission couplers were made. The waveguide structures were fabricated on a Nd-rich glass substrate using an ion-exchange process. The structure patterns were formed on the substrate by means of photolithography. Limited experiments demonstrating the fabrication of thick films by chemical vapor deposition on silica were also performed.

AD-A079 633/4 PC **A08**/MF **A01**
Hughes Aircraft Co Tucson AZ Missile Development Div
High Strength Rapid Payout Fiber Optic Cable Assembly.
Semi-annual technical rept. Aug 78-May 79,
D. S. Fox, and R. A. Eisentraut. Aug 79, 170p FR7956-0003, CORADCOM-78-2964-1
Contract DAAB07-78-C-2964

This report summarizes preliminary results obtained in the investigation of the feasibility of a fiber optic cable payout assembly capable of high speed payout with simultaneous optical transmission. The results of both cable design studies and payout assembly (dispenser) design studies are described. Experimental results for both optical attenuation and payout performance are provided. (Author)

AD-A079 653/2 PC **A02**/MF **A01**
IBM Thomas J Watson Research Center Yorktown Heights NY
Time-Resolved Infrared Spectral Photography,
D. S. Bethune, J. R. Lankard, M. M. T. Loy, and P. P. Sorokin. 18 Jun 79, 9p
Contract N00014-76-C-0907

A new technique was recently developed which allows broadband infrared absorption spectra to be photographed with approximately equal to 5 nsec time resolution, even under some conditions, in a single-shot. Experimental details and theoretical aspects of this method are discussed at length in. Briefly, the technique utilizes third order nonlinearities of alkali metal vapors to achieve two objectives: (1) generation of a pulsed, broadband, infrared continuum beam (NU sub ir) which can probe the absorption of a sample and (2) subsequent conversion of this i.r. beam, with its encoded spectral information about the sample, to the visible, where it can be photographically or photoelectrically recorded.

AD-A079 682/1 PC **A02**/MF **A01**
Visidyne Inc Burlington MA
Background Suppression and Spectral Detection Using Double-Beam Interferometry: Measurements,
Theodore Zehnpfennig, Saul Rappaport, and George A. Vanasse. 1979, 9p AFGL-TR-79-0291
Contract F19628-79-C-0005
Pub. in SPIE, v191 Multiplex and/or High-Throughput Spectroscopy, p71-78 1979. See also AD-A079 684.

No abstract available.

AD-A079 684/7 PC **A02**/MF **A01**
Visidyne Inc Burlington MA
Background Suppression and Spectral Detection Using Double-Beam Interferometry: Instrumentation,
Orr Shepherd, William Reidy, and George A. Vanasse. 1979, 9p AFGL-TR-79-0292
Contract F19628-79-C-0005
Pub. in SPIE, v191 Multiplex and/or High-Throughput Spectroscopy, p64-70 1979. See also AD-A079 682.

No abstract available.

AD-A079 748/0 PC **A05**/MF **A01**
Aerospace Corp El Segundo CA Electronics Research Lab
Strong Turbulence Effects on Short Wavelength Lasers.
Final rept.,
Michael T. Tavis, and Hal T. Yura. 15 Dec 79, 86p TR-0078(3608)-1, SD-TR-79-24
Contract F04701-77-C-0078

The mean square wander angle of a focused laser beam transmitted through a homogeneous-isotropic turbulent medium has been determined by the use of the extended Huygens-Fresnel principle. The theory is developed for both weak and strong turbulence conditions for which the electromagnetic field statistics are known. A heuristic formula for the wander angle is developed which connects the turbulence regimes. Although the theory is general, numerical results are determined for uniformly illuminated laser aperture only. The mean square angle of arrival of a spherical wave source in the laser focal plane and detected in the laser aperture plane is also determined. The correlation function of the angle of arrival, determined by means of the centroid, and the angle of arrival, determined by means of a least squares fit of the received phase over the aperture, is discussed. It is shown that this correlation is nearly 100% in the regime of weak turbulence conditions. Finally, engineering formulas useful for hand calculation of wander angle and peak on-axis transmitted intensity in the focal plane of a tilt corrected laser beam are presented. (Author)

AD-A079 767/0 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Contact Lenses and Diving: What Are the Risks.
Medical research progress rept.,
Mary M. Matzen. Nov 79, 5p Rept no. NMRI-79-48
Pub. in Faceplate, v10 n3 p14-15 1979.

No abstract available.

AD-A079 805/8 PC **A03**/MF **A01**
Hughes Research Labs Malibu CA
Blue/Green Coupled Wave Filter Study.
Final rept. 1 Jun-30 Nov 79,
J. F. Lotspeich, and D. M. Henderson. Jan 80, 42p
Contract N00014-79-C-0491

High-resolution measurements of AgGaS2 iso-index electrooptic filter samples have confirmed earlier theoretical predictions. We observed a filter passband of less than 1.0 A at 4970 A in a sample 3 mm thick and have achieved electrooptic control of transmission efficiency up to a maximum of 60% with about 1000 V. These results translate to filter passbands of less than 0.3 A in a 1-cm sample with comparable voltage requirements and with negligible electric power dissipation. The filter response for off-normal light beams indicates an FOV capability in excess of 60 half-angle (I/0.3) with less than a 20% increase in passband over that of the narrow-field condition. Fine tuning of the pass wavelength by temperature variation showed a tuning rate of 0.25 A/C. Theoretical characterization of iso-index materials demonstrated that crystals with large nonresonant birefringence and small fundamental bandgap shifts yield narrow passbands. A useful figure of merit for predicting filter performance was derived. Potentially useful materials include the II-VI mixed crystal semiconductors (CdS-ZnO) and the mixed ternary chalcopyrites (AgGaS2-CuAlS2). (Author)

AD-A079 984/1 PC **A04**/MF **A01**
Gte Sylvania Inc Mountain View CA Electro-Optics Organization

Simultaneous SRS and SHG in Lithium Iodate.
Final rept. May 78-May 79,
Eugene O. Ammann. Jul 79, 64p AFOSR-TR-79-1328
Contract F49620-78-C-0077

This report summarizes the results of a study of the simultaneous occurrence of stimulated Raman scattering (SRS), second-harmonic generation (SHG), and sum-frequency generation (SFG) in lithium iodate. The simultaneous occurrence of these processes in lithium iodate results in selectable, multiple outputs spanning the 0.54 to 0.65 micrometer region of the visible spectrum. The SRS/SHG/SFG device consists of a lithium iodate crystal placed inside a cw-pumped, repetitively Q-switched Nd:YAlO3 laser. Two-mirror and three-mirror versions of the SRS/SHG/SFG device were studied. The two-mirror SRS/SHG/SFG average power outputs that were achieved were 0.54 (1.13 W), 0.565 (78 mW), 0.592 (685 mW), 0.622 (98 mW), and 0.655 micrometers (107 mW). The three-mirror SRS/SHG/SFG outputs were 0.54 (950 mW), 0.565 (218 mW), 0.592 (202 mW), 0.622 (29 mW), and 0.655 micrometers (26 mW). Pulses obtained from the two-mirror setup were approximately 25 to 40 ns long; pulses obtained from the three-mirror setup were 4 to 10 ns long. Experimental and analytical studies were also carried out concerning interactions which occur between the simultaneous SRS, SHG, and SFG processes.

AD-A080 053/2 PC **A03**/MF **A01**
Defence Research Establishment Valcartier (Quebec)
Experimental Study of an Optical Guided-Beam Splitter,
D. Vincent, J. W. Y. Lit, P. Lavigne, and G. Otis. Oct 79, 39p Rept no. DREV-R-4161/79
Summary in French.

Measurements on the reflectance R of A guided-beam splitter have been performed. The fabrication method, based on the use of a thin wire as a mask, produces a groove with a parabolic thickness profile in a planar waveguide. The experimental results demonstrate that the theroretical expression R=tanh-Squared delta describes well the observed phenomena, especially when the TMo mode is incident on the groove. Additional applications of this device for polarization analysis and mode selection are also discussed. (Author)

AD-B013 275/3 PC **A16**/MF **A01**
National Bureau of Standards Washington D C
Interferometric Lens Testing.
Final rept. Mar 71-Feb 73,
John M. Jerke, and D. Nyyssonen. Sep 76, 357p AFAL-TR-76-33
Contract F33615-71-M-5007
Distribution limitation now removed.

Interferometric testing of optical systems measures the pupil function, or wavefront deviations from a reference sphere, of the lenses and mirrors. From this pupil function, the optical transfer function (OTF), spread function, and aberration coefficients may be computed. In the present study, a wavefront shearing interferometer (WSI) is developed and applied to the on-axis testing of lenses. The simple cube interferometer has all the interferometric adjustments built in during assembly. In contrast to most interferometric test systems, the WSI is inexpensive, portable, relatively insensitive to vibration, does not need laser illumination, and requires only a minimum of experimental time and operational expertise. Scanning the interferograms and subsequent data reduction are the major effort in testing with the WSI. A computer program for reducing input fringe data to the pupil function, OTF, and aberration coefficients is described; a program to plot the pupil function and OTF is included. Also, a computer program for deriving fringe locations from density data obtained with automatic scanning of the interferograms is described. Sample outputs of the computer programs are given.

N80-16322/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Conceptual Development of the Laser Beam Manifold (LBM).
W. Campbell, and R. B. Owen. Oct 79, 16p
NASA-TM-78248

The laser beam manifold, a device for transforming a single, narrow, collimated beam of light into several beams of desired intensity ratios is described. The device consists of a single optical substrate with a metallic coating on both optical surfaces. By changing the entry point, the number of outgoing beams can be varied.

PAT-APPL-6-085 453 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Windscreen Angular Deviation Measurement Device.
Patent Application,
Harry L. Task. Filed 16 Oct 79, 14p AD-D006 823/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus for detecting the angular deviation from an axis imparted to a ray when passing through a transparent medium, for resolving the angular deviation into its components, and for generating electrical signals accurately representing the magnitudes of such components is described. A laser beam is projected along an optical axis through the medium and focussed by a displacement compensation lens. The beam is divided into channels with a beam splitter, each channel being incident upon a transmission diffraction grating. Each grating, characterized by fine parallel lines of substantially random size and spacing generates a fan line of luminous energy. At a distance equal to the focal length of the lens, the fan lines cross detector arrays aligned parallel to the grating lines. A change in the angular deviation proportionally translates the crossing point along the detector array. (Author)

PAT-APPL-6-085 663 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Near Millimeter Bistable Device.
Patent Application,
R. Y. Chiao. Filed 17 Oct 79, 10p AD-D006 824/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention concerns a near millimeter bistable device having a source of electromagnetic radiation in optical alignment with a variable reflecting means in the form of a Schottky barrier diode corner cube assembly. Interposed between the radiation source and the variable reflecting means is a beam splitter which reflects a beam of energy from the variable reflecting means through another beam splitter to a detector. The voltage produced by the detector is fed through a feedback circuit back to the variable reflecting means in order to vary the reflectivity thereof. In this manner the output of the device emanating from the other beam splitter has two stable conditions, one of relativity high output plower and one of relatively low output power. (Author)

PAT-APPL-6-090 383 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Measurement of Windscreen Distortion Using Optical Diffraction.
Patent Application,
Harry L. Task. Filed 1 Nov 79, 15p AD-D006 828/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus and method for detecting, resolving and quantifying the distortion caused by a relatively large region of a distorting optically transparent medium is described. A prcisely defined pattern is viewed through the transparent medium to introduce the distortion effects. The altered pattern is photographically recorded in thin film transparency format. A beam of coherent luminous energy projected through the transparency, one focused, produces a Fraunhofer diffraction pattern which is the Fourier transform of the original pattern. Conventional distortion characteristics in the Fourier domain appear in a form more amenable to quantification and analysis. The character and magnitude of the distortion is readily ascertained by the comparing the transforms of distorted and undistorted patterns, yielding quantitative data comparable to conventional the distortion effects in terms of grid line slop and lens factor. (Author)

PAT-APPL-6-090 384 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Waveguide Line Spread Function Analyzing Apparatus.
Patent Application,
Joseph M. Geary. Filed 1 Nov 79, 10p AD-D006 829/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a waveguide line spread function analyzing apparatus utilizing a scanning optical slab waveguide that is sandwiched between two opposing x-ray fluorescent screens to provide access to the fluorescent light which is trapped between the two screens. (Author)

PAT-APPL-6-091 991 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Feedback Display System for Microscopic Optical Instruments.
Patent Application,
Richard S. Vonusa. Filed 7 Nov 79, 15p AD-D006 831/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A feedback display system for use with a microscopic optical instrument having at least one eyepiece. The feedback display system has a display unit operably attached to the eyepiece and incorporates therein a LED display which provides direct visual feedback to an individual who views imagery through the optical instrument. The LED display is interfaced to a computer which provides intelligent control of the feedback display system when activated by the operator of the optical instrument. When not activated, the feedback display system allows normal viewing through the optical instrument to take place. (Author)

PAT-APPL-6-097 594 PC **A03**/MF **A01**
Department of the Air Force Washington DC
Laser Autoalignment System.
Patent Application,
Wayne B. Lloyd. Filed 26 Nov 79, 28p AD-D006 895/7
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes an autoalignment system for a laser having a pair of reflector assemblies capable of providing six degrees of freedom of movement to the reflector element formed as part of each of the reflector assemblies. Each reflector assembly is made up of a reflector unit, a gimbal knuckle joint and a translator mechanism. The interconnection between the reflector unit and the gimbal knuckle joint provides for two degrees of freedom while the translator mechanism and its interconnection with the gimbal knuckle joint provides the additional four degrees of freedom. Cooling of the reflector elements is accomplished by way of a coolant system which is incorporated within the autoalignment system of the laser, while motivation of the autoalignment system is in the form of a plurality of drivers operably connected to the various elements of the reflector assembly. During utilization of the system in a vibrational environment, the autoalignment system maintains the correct relationship between the reflecting elements of the laser as well as providing sufficient cooling thereof. (Author)

PAT-APPL-6-100 319 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Depositing Optical Films of Controlled Composition.
Patent Application,
Conrad M. Phillippi. Filed 5 Dec 79, 10p AD-D006 885/8
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an improvement in the apparatus used for RF sputtering of target materials onto substrates. The invention addresses the structural alterations necessary to simultaneously sputter multiple material types onto a single sub-

strate with the ability to alter the composition of the deposited materials on a continuous basis. As taught and claimed herein a movable, grounded shield is interposed between the target and substrate in close proximity to the target. An aperture in the shield confines the sputtering plasma and deposits it on the face of the target. When the target is composed of multiple materials which are divided into adjacent segments, the selective location of the aperture and plasma defines the relative contributions of target materials transferred to the substrate. Temporal movement of the shield translates into corresponding variations of composition at various levels in the deposition. (Author)

PATENT-4 166 694 Not available NTIS
Department of the Navy Washington DC
Method for Optically Distorting Readout Reticles.
Patent,
John E. Horning, Roy R. Radzai, and John R. Hagstrom. Filed 28 Mar 78, patented 4 Sep 79, 5p AD-D006 860/1, PAT-APPL-890 891
Supersedes PAT-APPL-890 891-78, AD-D005 096.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for preparing distortion-compensated images on film reticles for use in a plural optical projector readout unit. An oversized matrix of the images is prepared with each legend proportionately positioned in the field of view corrsponding to one of the plural optical projectors. A very short focal length lens having one surface flat and the other convex is placed over the matrix with the flat surface adjacent thereto. The images, distorted through the lens, is photographed to produce a film reticle in a size suitable for use in the readout unit. the spherical aberration induced by the lens closely approximates the barrel distortion from the off-axis projection and magnification in the readout unit. In this manner, the image projected on the screen from the film reticle proportionately corresponds to the images in the matrix. (Author)

PATENT-4 176 919 Not available NTIS
Department of the Navy Washington DC
Passive High-Speed Automatic Shutter for Imaging Devices.
Patent,
Howard E. Rast, Jr. Filed 31 Jan 78, patented 4 Dec 79, 9p AD-D006 873/4, PAT-APPL-874 093
Supersedes PAT-APPL-874 093-78, AD-D004 730.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A passive, high-speed, automatic shutter for controlling the transmission of light energy of known wavelengths along a predetermined optical axis is provided to protect imaging devices against sudden, undesirable optical overload which may cause damage. A large plurality of contiguously positioned micro-channel optical waveguides is axially aligned parallel with the optical axis to intercept the light energy. The large plurality of micro-channel optical waveguides provides desirable maximization of resolution for transmitting the image to the imaging device. When the determinable level of intensity is not exceeded, optical images are transmitted through the large plurality of micro-channel waveguides to the imaging device which may desirably by positioned in an off-axis, angular disposition. However, when the determinable level of intensity of the known wavelengths of light energy is exceeded, the large plurality of micro-channel optical waveguides including the saturable absorber material becomes effectively transparent and transmits all such light energy along its initial optical axis so that the excess level of intensity of light energy does not reach the off-axis imaging device.

PATENT-4 181 774 Not available NTIS
Department of the Air Force Washington DC
Electromagnetic Interference Filter Window.
Patent,
Jerry P. Wendt, and Andrew J. Steckl. Filed 19 Dec 78, patented 1 Jan 80, 4p AD-D006 838/7, PAT-APPL-970 947
Supersedes PAT-APPL-970 947-78, AD-D005 945.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A laser window material for use in the infrared wavelength spectrum comprising a glass substrate having an indium tin oxide conductive film deposited in one surface thereof and magnesium fluoride antireflection films deposited atop the conductive film and the opposite surface of the glass substrate. (Author)

20I. Plasma Physics

AD-A079 665/6 PC **A02**/MF **A01**
Princeton Univ NJ Plasma Physics Lab
Self-Consistent Kinetic Theory of Stochasticity.
Interim rept.,
John A. Krommes. Aug 79, 16p PPPL-AF-89, AFOSR-TR-79-1330
Contracts F44620-75-C-0037, EY-76-C-02-3073
Presented at the International Workshop on Intrinsic Stochasticity in Plasmas, Corsica, 18-23 Jun 79.

It is argued that renormalized kinetic theory is the appropriate tool with which to study macroscopic properties of stochastic systems. Functional techniques are described which afford a self-consistent description of nonlinear excitation, propagation, and dielectric response of fluctuations in the stochastic regime. (Author)

AD-A079 919/7 PC **A04**/MF **A01**
Std Research Corp Arcadia CA
Magnetogasdynamic Phenomena in Pulsed MHD Flows.
Annual summary rept. 1 Oct 78-30 Sep 79,
David A. Oliver, Thomas F. Swean, Jr., D. M. Markham, C. D. Bangerter, and S. T. Demetriades. 1 Oct 79, 66p Rept nos. STD-UP-002-77-1, STDR-79-8
Contract N00014-77-C-0574

This work is aimed at the understanding, description, and prediction of magnetohydrodynamic phenomena exhibited under conditions of extremely high interaction and large magnetic Reynolds number. The plasmas which constitute the fluid medium in such flows may exhibit nonideal thermodynamic and kinetic behavior. The theoretical work has two principal objectives: the elucidation of basic phenomena in strong interaction high magnetic Reynolds number flows independently of specific experiments or machines, and the perfection of predictive theories to accurately describe and model specific experiments aimed at magnetohydrodynamic power production. In what follows we present the general mathematical description of magnetogasdynamic flows in the high magnetic Reynolds number regime. We present several illustrative calculations of quasi-one-dimensional transient effects in strong interaction flows. Two-dimensional high Reynolds number electricity results are presented including the realistic effects of nonuniform velocity and electrical conductivity resulting from hypersonic boundary layers and from shock-induced nonuniformities.

N80-16880/0 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Stability of a Toroidal Plasma by Hot Electron Annulus in a Bumpy Torus.
H. Sanuki, and M. Fujiwara. Dec 79, 18p IPPJ-426

The ballooning instability is analyzed in a bumpy configuration using a relatively simple fluid model of an inhomogeneous slab plasma with gravitational field simulating the bad curvature effect and the grad-B effect due to hot electron annulus. Mathieu type equation is derived to investigate a linear analysis. Stability boundary giving the maximum stable Beta sub p (beta value of bulk plasma) as a function of Beta sub h and the threshold for Beta sub h (beta value of hot electron annulus) are studied for Nagoya bumpy torus parameters. The relevance of our theoretical analysis is discussed in a comparison with the previous results.

N80-16881/8 PC **A03**/MF **A01**
Nagoya Univ. (Japan).
Finite Temperature Effect of Ray Tracing Near the Electron Cyclotron Resonance.
M. Tanaka, M. Fujiwara, and H. Ikegami. Nov 79, 26p IPPJ-427

Ray trajectories and power absorption of electromagnetic wave propagating in an inhomogeneous plasma are investigated in the frequency region near the electron cyclotron resonance. Plasmas are assumed to be cylindrical with the toroidal effect on magnetic field taken into consideration. Finite temperature effect on ray tracing is studied in detail by applying the geometrical optics to a warm plasma, and it is found that the geometrical optics cannot be applied in the region of the electron cyclotron resonance, where the group velocity does not coincide with the velocity of energy flow.

N80-16883/4 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Whistler Wave Trapping in a Density Crest.
H. Sugai, H. Niki, M. Inutake, and S. Takeda. Nov 79, 32p IPPJ-429

The linear trapping process of whistler waves in a field aligned density crest is investigated theoretically and experimentally below omega = omega sub c/2. The conditions of the crest trapping are derived in terms of the frequency omega/omega sub c, the incident wave normal angle theta sub i, and the density ration n sub i/n sub o. The oscillation length of the trapped ray path for a parabolic density profile is calculated. The phase and amplitude profile of the whistler wave measured along and across the crest is discussed. The experiment on antenna excited whistler wave performed in a large magnetized plasma with the density crest is described, the theory of the crest trapping is presented, bearing the antenna excitation experiments in mind, and the experimental apparatus and method are reported.

20J. Quantum Theory

PB80-805542 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Relativity Theory (Citations from the NTIS Data Base).
Rept. for 1970-Feb 80,
Brian Carrigan. Mar 80, 209p
Supersedes NTIS/PS-79/0183, NTIS/PS-78/0253, and NTIS/PS-77/0201.

Research studies are presented on special and general relativity. Gravitational theory, field theory, and space-time studies are included, as are studies involving Minkowski space, the Dirac equation, and Lorentz transformations. (This updated bibliography contains 202 abstracts, 9 of which are new entries to the previous edition.)

20K. Solid Mechanics

AD-A079 549/2 Not available NTIS
Naval Research Lab Washington DC Shock and Vibration Information Center
The Shock and Vibration Digest. Volume 11, Number 12,
Judith Nagle-Eshleman. Dec 79, 152p
See also Volume 11, Number 11, AD-A078 375.
Availability: Naval Research Lab., Attn: Code 8404. Washington, DC 20375. Annual Rate $100.00 (No copies furnished by DTIC).

No abstract available.

AD-A079 723/3 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Energy Release Rate Calculations for Interface Edge Cracks Based on a Conservation Integral.
Technical summary rept.,
A. Nachman, and J. R. Walton. Nov 79, 14p Rept no. MRC-TSR-2017
Contracts DAAG29-75-C-0024, F49620-79-C-0076
Sponsored in part by Grant AFOSR-77-3290.

A certain conservation integral, the so called M-integral, recently exploited by L. B. Freund in the calculation of stress intensity factors for cracks in homogeneous elastic media, is applied to the cal-

culation of energy release rates for interface edge cracks. Specifically, for an edge crack along the interface between two elastic wedges of different opening angles and dissimilar elastic properties, and that is subjected to point loads at the apex, a relation is derived among the length of the crack, the energy release rate of the crack, the applied loads, the wedge angles and the material parameters. (Author)

AD-A079 853/8 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Study of Short Cylindrical Shells with and without Cutouts under Pure Bending.
Master's thesis,
Carl J. Bang, Jr. Dec 79, 117p Rept no. AFIT/GA/AA/79D-1

In this report, short cylindrical shells are studied under pure bending. An edge kinematic constraint loading method is adapted for use with the STAGSC computer code. With it, short unstiffened cylindrical shells are studied for prebuckling displacements and compared with axially stressed cylinders. End rings are added to note their influence. The bending is applied to short internally stiffened (smeared stringer theory) cylinders with the resulting buckling values and patterns contrasted against axial loading. The L/R range of interest is from .698 to 1.361. Symmetrical and unsymmetrical 12 inch cuts are added to the stiffened cylinder to study the resulting affects from this imperfection. The results indicate. (a) For short length (L/R < or = 10) cylinders, end loading by bending rotation causes structural deformation patterns different than long cylinder bending deflections. (b) The imposed boundary effect for unstiffened cylinders diminishes with L/R increase until L/R = 20 where there is no noticable deformation influence. (c) End ring stiffeners studied did not alter the basic short cylinder deformation patterns. (d) Compressive zone buckling failure under bending can be modeled through axial compression analysis. (Author)

AD-A079 854/6 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Experimental Weight Function Method for Stress Intensity Factor Calibration.
Master's thesis,
Dan Bar-Tikva. Dec 79, 110p Rept no. AFIT/GAE/AA/79D-2

The weight function procedure allows one to convert stress intensity factors K and crack displacement information obtained for one crack configuration and loading into the stress intensity factor solution for the same geometry and another loading. The feasibility of using the weight function idea for a two-dimensional case with experimental results is demonstrated in this work. Mode I stress intensity factor K(I) measurements obtained by a laser interferometric technique, and 'crack mouth' opening displacement measurements were taken for an edge cracked strip subjected to four point bending. These results were used to construct (numerically) a weight function with the aid of a computer program written for this purpose. Results of K(I) for the same geometry with two different loading configurations, uniform tension and three point bending (with two different length to width ratios) were computed. These results agree favorably with the known solutions and demonstrate that a set of experiments for a single loading can accurately predict the stress intensity factor for any other loading configuration of the same geometry. The advantage of the weight function method would be particularly important if these loading configurations are difficult or impossible to reproduce in the laboratory. (Author)

AD-A079 859/5 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Modern Optimal Control Methods Applied in Active Control of a Cantilever Beam in Bending Vibration.
Master's thesis,
Keith Daniel Sanborn. Dec 79, 71p Rept no. AFIT/GA/AA/79D-9

The equations of motion for a cantilever beam in bending vibration are developed in state vector form using a normal mode approximation. A linear optimal control system generates a feedback control proportional to the state which is represented by modal amplitudes and velocities determined using position information from sensors. The observer gain matrix and the feedback control gain matrix are both determined from a steady state optimal regulator which minimizes the related quadratic performance index. Control is applied through point force actuators. System response is shown to be very sensitive to actuator location. Singular perturbation provided a method through which control spillover could be minimized for the actuator locations chosen, however, it did not provide the means by which the actuators could be positioned such that the spillover effect could be eliminated. Robustness of system response to modal amplitude errors was very good, and the unstable controllers tested did not appear to seriously affect this robustness.

AD-A079 905/6 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Effect of Imperfections on the Collapse of Rectangular Plates Using Variational Calculus.
Master's thesis,
Lyle G. Peck. Dec 79, 73p Rept no. AFIT/GAE/AA/79D-14

An analysis is made of the effect of initial imperfections in geometry on the collapse of simply-supported rectangular plates. A Reissner-type variational principle is employed to evaluate the load versus lateral displacement of elastic, elastic-plastic and orthotropic plates subject to compressive loading along two edges. Imperfection size and shape, plate thickness and aspect ratio, and for orthotropic material, the ply orientation is examined. The results indicate that the load-displacement curve is sensitive to the initial imperfection, particularly for elastic-plastic materials. The effect of plate size and aspect ratio are similar for all the plates considered with the collapse stresses higher for elastic plates than for elastic-plastic plates. The effect of plasticity becomes insignificant for thin plates when compared with plates with elastic properties. In general, it can be stated that the imperfection function determines the plate's collapse load. For orthotropic plates the effect of ply orientation is significant at aspect ratios less than 1 but relatively insignificant at higher values when comparing the minimum collapse stresses. The difference is dependent upon the magnitude of the ratio of Young's moduli in the major material axes. (Author)

AD-A080 081/3 PC **A02**/MF **A01**
Illinois Univ At Chicago Circle Dept of Materials Engineering
Wave Propagation in Three-Dimensional Inelastic Media.
Final rept. 26 Jan 76-15 Sep 79,
T. C. T. Ting. 11 Dec 79, 9p ARO-13157.3-E
Grant DAAG29-76-G-0121

The research supported by the Army grant was to study some aspects of three-dimensional waves in inelastic media. Inelastic media include elastic-plastic materials and viscoelastic solids. This report contains a summary of the results obtained from this investigation. (Author)

AD-A080 086/2 PC **A06**/MF **A01**
Liege Univ (Belgium) Lab de Techniques Aeronautiques Et Spatiales
Generalized Optimality Criteria for Frequency Constraints, Buckling Constraints and Bending Elements.
Final rept. 1 Aug 78-31 Jul 79,
Claude Fleury, and Guy Sander. Nov 79, 120p
L.T.A.S. NBR-SA-78, AFOSR-TR-80-0107
Grant AFOSR-78-3652

The structural optimization problem considered in this work consists in minimizing the objective function subject to a wide variety of constraints. The behavior constraints impose limitations on the quantities describing the structural response: static stresses and displacements under multiple loading conditions, natural frequencies and linear buckling load factors. In addition, side constraints are directly prescribed on the design variables themselves.

NUREG/CP-0010 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Reactor Safety Research.
CSNI Specialists Meeting on Plastic Tearing Instability Held at the Center for Fracture Mechanics, Washington University, St. Louis, Missouri, September 25-27, 1979.
Conference paper,
Paul C. Paris. Jan 80, 700p CSNI-39
Prepared in cooperation with Washington Univ., St. Louis, MO.

The Specialist Meeting on Plastic Tearing Instability was held at the Center for Fracture Mechanics, Washington University, St. Louis, USA, and was sponsored by the Committee on the Safety of Nuclear Installations (CSNI) of the OECD Nuclear Energy Agency. The meeting was hosted by the Center for Fracture Mechanics and by the United States Nuclear Regulatory Commission. The Meeting constituted a forum for the 45 participants to make presentations and to thoroughly discuss details of the material presented. Copies of the material presented appear in this report.

NUREG/CR-1220-V-1 PC **A07**/MF **A01**
Washington Univ., St. Louis, MO. Center for Fracture Mechanics.
Further Results on the Subject of Tearing Instability. Volume 1,
Paul C. Paris, and Hiroshi Tada. Jan 80, 148p
Contract NRC-03-78-135
See also Volume 2, NUREG/CR-1220-V-2.

Additional results on the subject of tearing instability are presented as a compilation of five technical papers by several authors. Collectively, the papers add to the development of tearing instability as originally presented in NUREG-0311, published in 1977. The papers strengthen the basis of tearing instability theory and illustrate the broad applicability of the underlying J-integral methodology. The second paper also deals with a method for J-R curve determination by load-displacement test record analysis which is of immediate importance to fracture mechanics experimentalists.

NUREG/CR-1220-V-2 PC **A08**/MF **A01**
Washington Univ., St. Louis, MO. Center for Fracture Mechanics.
Further Results on the Subject of Tearing Instability. Volume II,
Paul C. Paris, and Hiroshi Tada. Jan 80, 169p
Contract NRC-03-78-135
See also Volume 1, NUREG/CR-1220-V-1.

This report is a continuation of the series on tearing instability starting with NUREG-0311 in 1977 and immediately preceeded by Vol. I of this NUREG. Five papers were assembled; all were prepared by A. Zahoor and P. C. Paris to support the practical applicability of tearing instability. They carry the subject from a theoretical discussion of dJ in order to enhance the utility of the tearing modulus, T, through analyses of center-cracked panels under tension, including work-hardening considerations, to approximate analyses of flawed pressure vessels, tested to failure.

NUREG/CR-1221 PC **A06**/MF **A01**
Washington Univ., St. Louis, MO. Center for Fracture Mechanics.
Tearing Instability Analysis Handbook, Formulas and Curves,
Hiroshi Tada, and Paul C. Paris. Jan 80, 102p
Contract NRC-03-77-029

Information in handbook format is presented for tearing instability formulas on typical test configurations. A short introductory section addresses the use of the tearing modulus, T, in assessing crack growth instability. Three configurations are included in this, the initial publication of the handbook filler, namely: center-cracked panel, compact tension specimen, and three-point bend specimen.

NUREG/CR-1222 PC **A10**/MF **A01**
Washington Univ., St. Louis, MO. Center for Fracture Mechanics.
Techniques of Analysis of Load-Displacement Records by J-Integral Methods,
Hugo A. Ernst, and Paul C. Paris. Jan 80, 225p
Contract NRC-04-78-227

Exact methods are used to obtain J from a single load displacement record for different configura-

tions based on dimensional analysis and deformation theory of plasticity to imply the dependence of the load on crack length and displacement. The methods also permit the evaluation of the crack length increment a and hence complete J-R curves can be constructed. Formulae for T sub mat and T sub app are presented as well. Conditions for the existence of the so-called eta-factor are stated, and subsequnt simplifications of the general method by its use are shown. Results of analysis of experimental work for different configuration material combinations are presented showing the adequacy of the general methodology.

N80-16373/6 PC **A03**/MF **A01**
National Aerospace Lab., Tokyo (Japan).
The Free Vibration Equations, Natural Frequencies and Modal Characteristics of Closed Circular Cylindrical Shells.
T. Koga, and K. Komatsu. Apr 79, 45p NAL-TR-569T

The relative accuracies of the representative classical theories of thin shells are examined. The order of magnitude comparison of terms involved in the governing equations for the free vibrations of a circular cylindrical shell is the method utilized. The boundary conditions for the shells are taken into account and it is shown that the classical theories yield valid solutions accurate enough when taking into consideration the errors inherent in the Kirchhoff-Love hypothesis. A first approximation, consistent with the order of magnitude estimate, leads to a system of free vibration and boundary constraining equations. The approximation enabled a qualitative estimate of the forms of the characteristic solutions. The accuracy of the Donnell type approximation is investigated and a detailed account of the historical developments of the subject is provided.

N80-16374/4 PC **A06**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
Initial Imperfection Measurements of Integrally Stringer-Stiffened Cylindrical Shells.
J. Singer, H. Abramovich, and R. Yaffe. Dec 78, 124p TAE-330

The initial geometric imperfections of integrally stringer stiffened cylindrical shells were measured in a special scanning system, on laboratory scale. The system consists essentially of a probe, travelling along a helical path inside the shell, whose output is recorded digitally on a minicomputer. The imperfection measurements of 19 shells, employed in different test programs, are presented both in graphical form and as coefficients of Fourier series - a proposed standard representation for imperfection data.

PB80-138670 Not available NTIS
National Bureau of Standards, Washington, DC.
Direct Observations -- The Essential Ingredients for Discovering Fundamental Mechanisms of Fatigue.
Final rept.,
J. T. Fong. 1979, 5p
Pub. in Proceedings of the ASTM-NBS-NSF Fatigue Mechanisms Symposium, Kansas City, Missouri, May 1978, American Society for Testing and Materials, Special Technical Publication 675, p287-291 1979.

Through two stories from the history of medical science, both related to the theory of bloodletting as a treatment for inflammatory diseases, the importance of direct observations and the use of a numerical scheme in all scientific work, including fatigue mechanism research, are illustrated. Brief remarks on two specific questions arising from two earlier sessions on direct observations are inserted. The two questions are: (1) What is the connection between direct observations and quantitative microscopy. (2) What could fatigue design and testing engineers learn from the direct observations of fatigue damage at microscopic levels. A cautionary note on the temptation to extrapolate from insufficient direct evidence of fatigue damage is also included.

PB80-141682 Not available NTIS
National Bureau of Standards, Washington, DC.
Fatigue Mechanism--Key to the Solution of the Engineer's Second Fundamental Problem.
Final rept.,
J. T. Fong. 1979, 6p
Pub. as American Society for Testing and Materials, Philadelphia, PA., Special Technical Pub. 675. Prepared in cooperation with National Science Foundation, Washington, DC.
Pub. in Proceedings ASTM-NBS-NSF Fatigue Mechanisms Symp., Held at Kansas City, MO. on May 78.

The rationale for studying fatigue and fatigue mechanism is examined by considering two fundamental problems in engineering, namely, the problem of feasibility, by asking whether a product works, and the problem of fatigue, by asking whether a product lasts. It is shown that the first problem (feasibility) is easier than the second (fatigue) because the solution to the second requires experimental information of a time scale incompatible with that available to the engineer or the material scientist. To resolve this dilemma, it is proposed that advances in computer-aided quantitative microscopy, fracture mechanics, and many other allied disciplines, be incorporated in measuring microstructural changes due to fatigue at a time scale workable in a laboratory. It is concluded that such study in discovering fundamental mechanisms of fatigue holds the key to the solution of the second fundamental problem in engineering.

20L. Solid-State Physics

AD-A079 592/2 PC **A06**/MF **A01**
Ben-Gurion Univ of the Negev Beersheba (Israel)
Dislocation Influence on the Electrical and Optical Properties of Semiconductors.
Final scientific rept. 1 Jan 78-31 Mar 79,
Samson Mil'shtein. 1979, 104p AFOSR-TR-79-1355
Grant AFOSR-78-3526

Investigation of dislocation influence on electrical and optical properties of both semiconductor materials and devices are currently in vogue. If one knew the dislocation influence on electron state spectrum in semiconductors then most of the changes in properties of deformed semiconductors could be explained and even some predictions could be made. However, the concurrent presence of point defects (with their energy levels) and Cottrell atmospheres complicates the problem and leads to ambigous information on the energy levels resulting from the presence of dislocations. Part of the point defects could be thermally annealed in order to separate out the side effects. Therefore one of the main objects of the investigation was to separate outside effects, due to point defects, Cottrell impurity atmospheres, and the diffusion of gold during contact preparation, from the dislocation effects.

AD-A079 594/8 PC **A07**/MF **A01**
Washington Univ St Louis MO Semiconductor Research Lab
Impurity and Defect Behavior in High-Purity Epitaxial GaAs.
Final rept. 1 Jan 76-31 May 79,
C. M. Wolfe, and K. H. Nichols. 26 Sep 79, 130p 59356-6, AFOSR-TR-79-1326
Grant AFOSR-76-2950

Although a number of mechanisms have been proposed to explain the existence of impurity gradients in epitaxial GaAs, the impurity gradient model presented in this report shows that such effects are inherent to the growth process. That is, when the carrier concentrations in the substrate, growing layer, and at the growth surface are different at the growth temperature, non-uniform time-dependent electric fields are obtained in the layer. These fields can enhance or retard the motion of ionized impurities and defects during growth producing impurity gradients at the outer surface and different conductivity regions at the epitaxy-substrate interface. High temperature resistivity and Hall coefficient measurements were made on epitaxial layers and substrates and analyzed using a self-consistent four-band model to obtain quantitative results for the impurity gradient model for growth on heavily-doped n-type substrates predicts that thin (0.05 micrometers or larger) p-type regions at the epitaxy-substrate interface will be produced under conditions commonly encountered in the epitaxial growth of GaAs.

AD-A079 637/5 PC **A04**/MF **A01**
Colorado State Univ Fort Collins Dept of Physics
Dielectric Layers on III-V Semiconductors.
Annual rept. Jun 76-Sep 79,
James R. Sites. Oct 79, 57p Rept no. SF25
Contract N00014-76-C-0976

Dielectric layers, particularly SiO2, Si3N4, and AlN, have been deposited on GaAs and other compound semiconductors for several purposes: (1) study of MIS structures, (2) encapsulation during annealing, and (3) electronic profiling of epitoxial layers. Development of the ion beam sputtering technique has paralleled the dielectric studies. (Author)

AD-A079 645/8 PC **A08**/MF **A01**
Southern Methodist Univ Dallas TX Dallas Geophysical Lab
Energy Dissipation of Rayleigh Waves due to Absorption Along the Path by the Use of Finite Element Method.
Interim rept.,
Eugene Herrin, Tom Goforth, and Ali A. Feizpour. 31 Jul 79, 165p AFOSR-TR-79-1317
Contract F49620-76-C-0030, DARPA Order-3291
Sponsored in part by Grant NSF-EAR77-13714.

A normally incident Rayleigh wave may be used for the investigation of a general vertical boundary and the attenuation of a viscoelastic medium. Use of energy conservation and proper boundary conditions produce 2 N second order differential equations, N being the number of viscoelastic layers in the medium. The homogeneous part of the differential equations can be transformed into an eigenvalue problem by the use of finite element technique; the eigenvalue and eigenvectors of the eigenvalue problem are the wavenumbers and the displacement amplitudes of the viscoelastic layered medium. The real and imaginary parts of the wavenumber determine the phase velocity and the attenuation of the layered medium, respectively. Dispersion and the attenuation curves can be obtained by using different periods. The above wavenumbers can be used in the inhomogeneous differential equation; this equation contains the effect of the vertical boundary; solution of this equation determines the displacement at the vertical boundary.

AD-A079 646/6 PC **A05**/MF **A01**
Research Triangle Inst Research Triangle Park NC
Quaternary Alloy Microwave MESFET.
Final technical rept. 1 Mar 77-30 Sep 79,
J. W. Harrison, S. B. Phatak, M. A. Littlejohn, G. Kelner, and H. H. Stadelmaier. 30 Nov 79, 89p RTI/1437/00-02F, AFOSR-TR-79-1321
Contract F49620-77-C-0062

Liquid phase epitaxial growth techniques have been used to grow quaternary alloys, Ga sub 1-x In sub x P sub 1-y As sub y, on InP substrates, using (100), (111) A and (111) B orientations. Liquidus and solidus data at 660 C have been used to determine distribution coefficients for P, As, and Ga in the melt. Compositions lattice matched to InP have been grown as single crystals. A preliminary X-ray evaluation of structure shows no detectable long-range ordering. Best electronic properties to date have been a Hall mobility of 4000 sq cm/V-sec at room temperature with a carrier concentration of 3.8 times ten to the 16th power per cc in material which has not been intentionally doped. Deposition of gold contacts on alloy samples yielded nonlinear current-voltage characteristics, but with poorly defined barriers. (Author)

AD-A079 656/5 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Infrared Nonlinear Optics in Semiconductors.
Final rept. 1 Oct 75-30 Sep 79,
Peter A. Wolff. 1979, 13p AFOSR-TR-79-1313
Grant AFOSR-76-2894

A variety of nonlinear optical processes in semiconductors, have been investigated experimentally and theoretically. Among them are: nonlinear optical-impurity interactions, spin-induced four-photon mixing, FIR difference frequency generation, parametric excitation of plasma waves, nonequilibrium carrier dynamics under intense laser excitation, and enhanced four-photon mixing in the Gunn effect regime. The ultimate goals of this work are the development of tunable IR sources; and the understanding of carrier dynamics in semiconductors. (Author)

AD-A079 679/7 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology/Devices Lab
One-Dimensional Ising Chain with Generalized Molecular Field,
G. J. Iafrate, A. Ballato, and M. I. Bell. 18 Jan 79, 9p Rept no. DELET-TR-79-26
Pub. in Jnl. of Magnetic Materials, v12 p135-139 1979.

No abstract available.

AD-A079 708/4 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Inverse Reflection Problem for a Smoothly Stratified Elastic Medium.
Technical summary rept.,
W. Symes. Oct 79, 43p Rept no. MRC-TSR-2007
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525

The subject of this paper is a version of the inverse reflection problem for a smoothly stratified elastic medium. The same mathematics describes the inverse problem of the vibrating string. This problem is solved in a constructive way. Also, a priori estimates are derived which exhibit the continuous dependence of the solution (index of refraction, relative sound speed) on the data (scattering or reflection measurements). (Author)

AD-A079 715/9 PC **A03**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Elastic Domain Wall Waves in Ferroelectric Ceramics and Single Crystals.
Annual progress rept. 1 Feb 79-31 Jan 80,
B. A. Auld. Jan 80, 30p Rept no. GL-3076
Contract N00014-79-C-0222

A theoretical formulation is given for solving problems of elastic waveguiding by and wave scattering at a 'duct' consisting of a spatial variation of material parameters with an arbitrary profile function. Both nonpiezoelectric and piezoelectric materials are treated. For the latter case, examples of calculated displacement and electric potential fields are given for several guided modes and several widths of duct. (Author)

AD-A079 914/8 MF **A01**
Dayton Univ OH Research Inst
Computerized Processing and Graphic Representation of Viscoelastic Material Property Data.
Interim rept. Oct 77-Mar 78,
Carl S. King, Jr. Aug 79, 109p UDR-TR-78-49, AFML-TR-79-4099
Contract F33615-76-C-5137
Availability: Microfiche copies only.

A means of fitting viscoelastic material properties data to specified curves and graphing the data and curves adds tremendously to the technology advancements in the state of the art for data processing. A computer program is developed to accomplish the technology advancements for the viscoelastic material properties data. (Author)

AD-A079 941/1 PC **A04**/MF **A01**
Honeywell Inc St Petersburg FL Avionics Div
Technology Study on Piezoelectric Materials.
Final rept. Jul-Dec 78,
W. B. Harrison, and A. G. Thalheimer. 20 Jul 79, 58p DNA-4859F, AD-E300 644
Contract DNA001-78-C-0328

The use of Honeywell's ring laser gyros technology is being considered for maneuvering reentry vehicle guidance where hostile nuclear radiation environments may be encountered by the ring laser gyro and its path length control (PLC) transducer. In an effort jointly sponsored by SAMSO and DNA, Honeywell and IRT 1 performed tests and analytical analysis on an operating laser gyro. It was shown that some 'mode hopping' transient motions were produced by the PLC transducer when subject to x-ray exposure. The materials used in the PLC transducer were analyzed and the high Z lead zirconate-lead titanate (PZ-PT) materials used in the transducer were considered as a partial cause of this phenomena. This program was therefore initiated to determine if lower Z materials, free of lead, were suitable replacements for the PZ-PT used in the PLC driver section of the transducer. (Author)

AD-A079 980/9 PC **A07**/MF **A01**
Raytheon Co Waltham MA Research Div
P-Type Gallium Arsenide Epitaxial Growth.
Final technical rept. 22 May 78-22 May 79,
S. R. Steel, K. K. Johnson, B. D. Lauterwasser, A. D. Barlas, and L. Holway, Jr. Aug 79, 131p S-2559, AFAL-TR-79-1144
Contract F33615-78-C-1456

At the beginning of this program, the rapid development of double-drift GaAs IMPATT diodes at X-band was being retarded by limited knowledge of the optimum growth conditions and the basic physical properties of p-type GaAs. Although p-type material with doping levels suitable for X-band double-drift devices was grown before this program began, profile control was sometimes erratic and wafer yield was poor. There was also a serious need for further data on hole velocities and ionization coefficients at the temperatures and electric fields existing in double-drift devices. In the first task of this program, we explored three p-type doping techniques, one involving zinc alkyl, and two involving zinc iodide formed as needed by chemical reaction. The zinc alkyl process was found to be chiefly useful for p++ contacts; the two zinc iodide processes gave useful p-doping at levels suitable for devices form X- to Ka-band. In the second task of this program, we measured hole velocities as a function of electric field and temperature which averaged about 70 percent of those reported previously. We also determined ionization coefficients at very high fields, typical of high power Ka-band devices. In the third task, we grew X-band and Ka-band p-type low-high-low Read wafers with good reproducibility.

AD-A079 981/7 PC **A02**/MF **A01**
Fairchild Camera and Instrument Corp Palo Alto CA
ESR Centers, Interface States, and Oxide Fixed Charge in Thermally Oxidized Silicon Wafers,
Philip J. Caplan, Edward H. Poindexter, Bruce E. Deal, and Reda R. Razouk. 5 Mar 79, 14p
DELET-TR-79-25
Contracts DAAG29-78-C-0033, DAAB07-77-C-2665
Pub. in Jnl. of Applied Physics, v50 n9 p5847-5854 Sep 79. Presented at the IEEE Semiconductor Interface Specialists Conference, Miami, FL, 30 Nov-2 Dec 78.

No abstract available.

AD-A079 983/3 PC **A02**/MF **A01**
Advanced Research and Applications Corp Sunnyvale CA
Photoemission Yields at Low X-Ray Energies.
Annual technical rept. 1 May 78-30 Sep 79,
M. J. Bernstein. 30 Oct 79, 18p ARACOR-TR-20-1, AFOSR-TR-79-1327
Contract F49620-78-C-0092

Photoelectron emission parameters have been studied using x radiation in the 1 to 6 keV range. A retarding-potential analyzer was developed to determine the yields of primary electrons about 50 eV and secondary electrons below 50 eV. Yields were measured at eight monochromatic x-ray energies using photoemitting surfaces of gold, silver, aluminum, titanium, silicon, deposited graphite, glass, anodized aluminum, Mylar and Saranwrap. The primary yields agreed well with previous results for Au, Al and Ti. The ratios of primary to secondary yields were highest at the low end of the photon-energy range; at 1.26 keV, these secondary-to-primary ratios ranged from about 6 for the oxides of Al and Si down to only 1.2 for Mylar. Supplementary total yield measurements on the above materials were made using pulsed low-energy x radiation. Studies were begun on measuring and analyzing the energy distribution of primary electrons. (Author)

AD-A080 061/5 PC **A02**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Magnetomechanical Coupling and Magnetostriction in Vertically Zoned Tb.27Dy.73Fe2,
H. T. Savage, R. Abbundi, and A. E. Clark. 1 Nov 79, 14p Rept no. NSWC/TR-79-463

We have prepared large grain-oriented samples of Tb(.27)Dy.73)Fe(2) by a vertical free-standing zone technique. The samples have larger values of magnetomechanical coupling and longitudinal magnetostriction than random polycrystalline samples prepared by arc melting. The materials have been characterized by microprobe and grain structure studies. (Author)

AD-A080 078/9 PC **A02**/MF **A01**
Missouri Univ-Rolla
Ion Implantation in Perovskite Type Ferroelectrics.
Progress rept. no. 6 (Final), 1 Nov 76-31 Oct 79,
Robert Gerson. 20 Dec 79, 15p ARO-14313.1-P
Grant DAAG29-77-G-0001

The object of this work was to study ion implantation in perovskite ferroelectrics and to investigate the conductive behavior of implanted layers. Implantation experiments were carried out on strontium titanate, barium titanate (single crystal and ceramic), titanium dioxide (rutile), lithium niobate, and lithium tantalate. Ion beams attempted were H(+), B(+), C(+), N(+), Fe(+), Ar(+), As(+), Ta(+), and Nb(++). In general the most effective ion in producing conductivity was boron, B(+). Significant conductivity was measured in the substrates above, except for single crystals of barium titanate and lithium tantalate. Boron implanted in strontium titanate and subsequently annealed resulted in highly conductive layers, whose sheet resistance could be between 100 and 100,000 ohm per square. The charge carrier mobility in this system was 5 sq. cm/volt sec at room temperature, increasing to 100 sq. cm/volt sec at 77 K. Implantation doses were 10 to the 16th power to 10 to the 17th power ions/sq. cm. The implantation depth, as revealed by chemical stripping experiments, was about 500 nm. A conductive anomaly was measured in some samples at 105 K, the cubic-tetragonal transition temperature.

AD-B006 948/4 PC **A20**/MF **A01**
General Dynamics/Pomona Calif Pomona Div
Lead-Tin Telluride Sputtered Thin Films for Infrared Sensors.
Final technical rept. 15 Oct 71-15 Oct 74,
Esther Krikorian, M. J. Crisp, and R. J. Sneed. Jun 75, 451p TM-6-125-PH-431, AFML-TR-75-63
Contract F33615-72-C-1042
Distribution limitation now removed.

A study was carried out aimed at preparing thin ternary compound films suitable for infrared sensor application. An investigation was pursued to control or optimize the structural, compositional, electrical and electro-optical film properties by means of well defined deposition parameters and conditions. Techniques were first developed for sputtering single crystal thin films of lead tin telluride (PbSnTe) on barium fluoride and calcium fluoride substrates. Both supported discharge and ion beam sputtering were used. The sputtering gas was argon. Most data was obtained by supported discharge sputtering. Thirteen sputtering targets of PbSnTe were used with ratios of tin to total metal (lead plus tin) of x = 0.15 to x = 0.32. Some targets were prepared metal or tellurium rich but most were stoichiometric, i.e. having the same number of tellurium atoms as metal atoms. The upper substrate temperature for single crystal growth was about 350 C and the lower temperature ranged from about 225 to 300 C for growth rates from 0.5 to 2.5 micrometers hr. Outside this temperature-growth rate regime the films were not single crystal. The x-value of the deposited film, which defines the energy gap, was found to be controllable by the x-value of the target, the substrate temperature, and the deposition rate. Aside from film x-values, the stoichiometry of the film materials was found to be also controllable by adjustment of the substrate temperature and deposition rate. Complete stoichiometry, which is associated with the lowest achievable carrier concentrations, was found to occur at critical temperature-rate products - which differ with different target x-values.

AD-B009 740/2 PC **A12**/MF **A01**
Rca Labs Princeton N J
Improved CVD Techniques for Depositing Passivation Layers of ICs.
Final rept. 22 Apr 74-30 Jun 75,
Werner Kern, Robert B. Comizzoli, A. Wayne Fisher, and George L. Schnable. Oct 75, 256p PRRL-75-CR-38, AFML-TR-75-160

Contract F33615-74-C-5146
DDC Form 55 not necessary for document request.
Distribution limitation now removed.

This report describes the results of studies to increase the understanding of the requirements for successful glass passivation, by chemical vapor deposition (CVD), of metallized silicon planar integrated circuits (ICs) to improve both performance and reliability. The effects of various conditions for low-temperature (350 to 450 C) CVD of phosphosilicate glass (PSG) layers by oxidation of silane plus phosphine were correlated with the physical and chemical properties of deposited films. It is concluded that the important conditions to control are substrate temperature of deposition, oxygen-to-hydride ratio, hydride input, silane-to-phosphine ratio, and nitrogen input.

PB80-132756 Not available NTIS
National Bureau of Standards, Washington, DC.
Face Dependence of the Spin Polarization of Photoelectrons from NEA GaAs (100) and (110).
Final rept.,
D. T. Pierce, G. C. Wang, and R. J. Celotta. 1 Aug 79, 3p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Appl. Phys. Lett. 35, n3, p220-222, 1 Aug 79.

Measurements of the spin polarization P of photoelectrons from negative electron affinity (NEA)GaAs(100) are presented. It is found that P = 43% at a photon energy of 1.57 eV. This contrasts with a maximum P = 21% measured by Erbudak and Reihl for NEA GaAs(110), which led them to conclude that NEA and high P exclude each other. This difference in P is important for sources of polarized electrons employing photoemission from GaAs. It is suggested that the origin of this difference may be connected with differences in the photoelectron emission process at the two faces, as calculated by Burt and Inkson.

PB80-135015 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
The Diffusion and Self-Diffusion Process in CdTe.HgTe,
F. A. Zaitov, L. A. Bovina, and V. A. Stofeev. 1979, 9p TT-79-58160, DMDC-18652
Trans. of Vsesoniznoe Soveshchanie Prob. Fiz. Soedinenie, Vilnius (USSR) v6 p165-169 1972.
Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The diffusion of Au, In, and Sn isotopes in CdTe-HgTe is measured in specimens of n- and p-type conductivity in the temperature range 200 to 450C for 24 to 100 hours. The self-diffusion of Hg was also measured. Diffusion coefficients were determined as a function of partial pressures and homogenizing heat treatments. Sectioning of the specimens was through mechanical grinding. Mathematical expressions were arrived at from the experimental data.

PB80-138662 Not available NTIS
National Bureau of Standards, Washington, DC.
Statistical Aspects of Fatigue at Microscopic, Specimen, and Component Levels.
Final rept.,
J. T. Fong. 1979, 30p
Pub. in Proceedings of the ASTM-NBS-NSF Fatigue Mechanisms Symposium, Kansas City, Missouri, May 1978, American Society for Testing and Materials, Special Technical Publication 675, p729-758 1979.

The study of fatigue mechanisms at the microscopic level is examined. The complexity of the microstructure and the availability of quantitative microscopy concepts created a need to introduce statistical tools to the fundamental aspcts of fatigue research. Examples of the corrosion fatigue of high-strength steel, the bending fatigue of currency paper, and the swelling of nuclear fuel elements are used to illustrate this new viewpoint. The statistical concept of stress in a medium with distributed voids or other geometric imperfections is introduced to permit the use of models different from the conventional continuum viewpoint. The concept of a nested model and the incorporation of a size effect in the study of fatigue at three microscopic levels and three macroscopic (specimen, component, structure) levels are discussed.

PB80-140700 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Liquid Phase Epitaxial Growth of Gallium Arsenide.
Technical rept.,
M. Folkard. Aug 79, 39p ERL-0078-TR, AR-001-668

This report discusses two methods of liquid phase epitaxial growth applied to the compound semiconductor gallium arsenide, and develops a mathematical description for each using a diffusion-limited model. The properties of the epitaxial layers grown under various experimental conditions are discussed, and the observed growth rates compared with those predicted by the mathematical models. From the differences observed, it is concluded that processes additional to simple diffusion of solute through the melt are occurring. Convective mixing caused by horizontal temperature gradients within the melt is suggested as an explanation for these differences.

PB80-141690 Not available NTIS
National Bureau of Standards, Washington, DC.
Surface Magnetization of Ferromagnetic Ni(110): A Polarized Low-Energy Electron Diffraction.
Final rept.,
R. J. Celotta, D. T. Pierce, G. -C. Wang, S. D. Bader, and G. P. Felcher. 3 Sep 79, 4p
Prepared in cooperation with Department of Energy, Washington, DC. and Office of Naval Research, Washington, DC.
Pub. in Phys. Rev. Lett., v43 n10 p728-731, 3 Sep 79.

The magnetic field dependence (hysteresis curve) and the temperature dependence of the magnetization ata NI(110) surface was measured by polarized low-energy electron diffraction. The diffracted intensities are spin dependent by a few percent. The temperature dependence of the surface magnetization measured in the range $0.5<T/T(c)<0.8$, is significantly different from that of the bulk.

PB80-144231 Not available NTIS
National Bureau of Standards, Washington, DC.
Amorphous Magnetic Rare Earth Alloys.
Final rept.,
J. J. Rhyne. 1979, 36p
Pub. in Chapter 16 in Handbook on the Physics and Chemistry of Rare Earths, p259-294 1979.

This article reviews experimental and theoretical aspects of amorphous rare earth alloys. Special emphasis is placed on atomic structure determination and models, magnetic behavior, and the magnetic phase transition in these alloys.

20M. Thermodynamics

AD-A079 757/1 PC **A12**/MF **A01**
Oregon Univ Eugene Dept of Physics
Turbulence and Statistical Mechanics.
Final rept. 1 Jul 76-30 Sep 79,
Russell J. Donnelly. 1 Nov 79, 257p AFOSR-TR-79-1357
Grant AFOSR-76-2880

This report summarized research during the period July 1, 1976 to October 1, 1979 directed to understanding turbulence in superfluid helium heat transport. This study showed, for the first time, how to create a reasonably homogeneous turbulent flow in a test section of a heat flow channel. The first systematic study of the power spectrum of turbulent fluctuations was completed. Several theoretical studies of helium II were also published, treating elementary excitations, temperature dependent energy levels, equations of motion and restricted geometries. (Author)

N80-16837/0 PC **A11**/MF **A01**
California Inst. of Tech., Pasadena.
Second Sound Shock Waves and Critical Velocities in Liquid Helium 2.
Ph.D. Thesis.
T. N. Turner. 1979, 231p NASA-CR-162687
Grant NSG-7508

Large amplitude second-sound shock waves were generated and the experimental results compared to the theory of nonlinear second-sound. The structure and thickness of second-sound shock fronts are calculated and compared to experimental data. Theoretically it is shown that at T = 1.88 K, where the nonlinear wave steepening vanishes, the thickness of a very weak shock must diverge. In a region near this temperature, a finite-amplitude shock pulse evolves into an unusual double-shock configuration consisting of a front steepened, temperature raising shock followed by a temperature lowering shock. Double-shocks are experimentally verified. It is experimentally shown that very large second-sound shock waves initiate a breakdown in the superfluidity of helium 2, which is dramatically displayed as a limit to the maximum attainable shock strength. The value of the maximum shock-induced relative velocity represents a significant lower bound to the intrinsic critical velocity of helium 2.

PB80-138704 Not available NTIS
National Bureau of Standards, Washington, DC.
Comparison of Freezing Temperatures of the National Bureau of Standards SRM-740 Zinc Standards.
Final rept.,
G. T. Furukawa, and J. L. Riddle. 1979, 3p
Pub. in Proceedings of the Session Comite Consultatif De Thermometrie Meeting (12th), Sevres, France, May 9-10, 1978, Annexe T 23, pT133-T135.

Freezing-point cells prepared with National Bureau of Standards SRM-740 zinc standards of 99.9999 percent nominal purity were intercompared. The results show that the freezing points agree within about 0.1 mK.

PB80-140916 Not available NTIS
National Bureau of Standards, Washington, DC.
Proposed Role for the Triple-Point Temperature of Gallium in the Definition of the International Practical Temperature Scale.
Final rept.,
B. W. Mangum, and D. D. Thornton. 1979, 3p
Pub. in Proceedings Comite Consultatif de Thermometrie Meeting (12th), Held at Sevres, France on May 9-10, 1978, Annexe T22 pT130-T132 (Bureau International des Poids et Mesures, Pavilion de Breteuil, F-92310, Sevres, France, 1979).

The authors found that as a temperature fixed point the triple point of gallium at 29.77406 degrees C is superior in many regards to the triple point of water which presently plays a key role in the IPTS. In this submission, the authors propose that the national standards laboratories undertake appropriate testing of the gallium triple point as a thermometric fixed point and if it is found to be suitable, that the triple point of gallium displace the triple point of water from its role in the IPTS.

PB80-140924 Not available NTIS
National Bureau of Standards, Washington, DC.
Superconductive Fixed Points for Temperatures Above 0.5K.
Final rept.,
J. F. Schooley. 1979, 3p
Pub. in Proceedings Comite Consultatif de Thermometrie Meeting (12th), Held at Sevres, France on May 9-10, 1978, Annexe T8, pT86-T88 (Bureau International des Poids et Mesures, Pavillon de Breteuil, Sevres, France, 1979).

This paper is a progress report on the National Bureau of Standards study of superconductive temperature reference points above 0.5K. Reproducibility of critical temperatures for Nb, Nb3Sn, and V3Ga has been studied.

PB80-805765 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Superfluidity (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Brian Carrigan. Mar 80, 179p
Supersedes NTIS/PS-79/0182, NTIS/PS-78/0242, and NTIS/PS-77/0249.

The cited reports discuss superfluidity in liquid helium, with both helium 3 and helium 4 considered. Topics discussed include phase studies, heat transfer, hydrodynamics, rotons, zero sound, first sound, second sound, third sound, and fourth sound. (This updated bibliography contains 172 abstracts, 9 of which are new entries to the previous edition.)

20N. Wave Propagation

AD-A079 598/9 PC **A02**/MF **A01**
Arizona Univ Tucson Dept of Electrical Engineering
Experimental Investigation of Electromagnetic Pulse (EMP) Propagation in a Conduction Plasma.
Final rept. 1 Oct 75-30 Sep 79,
R. N. Carlile. 29 Nov 79, 20p AFOSR-TR-80-0001
Grant AFOSR-76-2949

The electromagnetic pulse (EMP) generated by a nuclear detonation has been the subject of extensive study. Computer codes have been developed which attempt to model the generation and propagation of the EMP due to both a high altitude and low altitude detonation. In some of these codes, the current density term which appears in Maxwell's equations due to conduction currents of secondary electons is modeled as a function of conductivity which is spatially and time dependent. A more complete description of the conduction currents is given by the familar fluid transport equations for mass, momentum and energy, which are collectively called the swarm equation. (Author)

AD-A079 621/9 MF **A01**
Georgia Inst of Tech Atlanta School of Electrical Engineering
Computer Routines for Use in Second-Order Volterra Identification of EMI.
Final technical rept. 1 Oct 77-30 Sep 78,
V. K. Jain, and J. S. Osman. Nov 79, 89p RADC-TR-79-266
Contract F30602-75-C-0118
Prepared in cooperation with University of South Florida. Tampa. Dept. of Electrical Engineering, Rept. no. SS-18VRA.
Availability: Microfiche copies only.

Computer routines are developed for application in Volterra modeling of weakly nonlinear systems, The FORTRAN program 'IGRAM' identifies the parameters of a linear black-box model as given by the pencil-of-functions method. The FORTRAN program 'HPMINV' yields high accuracy inversion of residue matrices that arise in Volterra system identification. (Author)

AD-A079 943/7 PC **A04**/MF **A01**
Irt Corp San Diego CA
DYNACYL Predictions of Air Pressure Effects on Electron-Beam IEMP.
Final rept. 31 Oct 77-31 Oct 78,
T. Buckman. 28 Dec 78, 52p IRT-8168-003, DNA-4793F, AD-E300 647
Contract DNA001-77-C-0285

The DYNACYL computer code has been used to predict the effect of air pressure on the currents and fields inside a right-circular cylinder irradiated on one end with a pulse-electron beam. Description of the incident beam was provided by the Harry Diamond Laboratories and was used to determine the value for the input variables. The results presented in this document will be used by Harry Diamond Laboratories for the Defense Nuclear Agency.

AD-A080 035/9 MF **A01**
Naval Ocean Systems Center San Diego CA
Quiet Time Lowest Observable Frequency (QLOF) Calculation Program.
Interim rept. Jan 78-Jan 79,
P. E. Argo, and D. B. Sailors. 1 Apr 79, 16p Rept no. NOSC/TD-231
Availability: Microfiche copies only.

The lowest observable frequency (LOF) for a specified hf circuit is important when one is specifying the propagation window for that circuit. This lowest frequency is an absorption controlled effect. The major cause of absorption at low and midlatitudes is the solar created ionospheric D-region. During quiet solar conditions this D-region responds directly to the amount of ionizing solar radiation reaching it. As shown in Bleiweiss (1970, 1972) and Argo and Hill (1977), this solar control is directly related to the solar zenith angle. Other relevant parameters are latitude, sunspot number, and season (calculated from Julian day), which are all described in Argo and Hill (1977). The computer program listing presented in the appendix contains the necessary subroutines for calculating the quiet time LOF (QLOF), and a sample control routine for driving the set of subroutines.

AD-A080 094/6 PC **A08**/MF **A01**
Auburn Univ AL Engineering Experiment Station
Singularities, Coupling Coefficients, and Mode Vectors for a Thin Wire Scatterer Parallel to a Lossy Ground.
Final rept.,
T. H. Shumpert. 15 Dec 79, 156p AFOSR-TR-80-0013
Grant AFOSR-79-0017

The Singularity Expansion Method (SEM) coupled with the reflection coefficient approximation seems to be an appropriate technique for analyzing a cylindrical scatterer over a finitely conducting ground. Pole locations of the cylinder over perfect ground calculated by investigators were found to be identical to those calculated in this analysis when the ground conductivity is large. Also, when the ground conductivity is reduced with the relative permittivity held at unity, calculated pole locations agree with those of the free space problem. These facts add credence to the reflection coefficient technique. In general, it is found that displacement of the singularities from their free space position is a function of discontinuity in the ground plane. The mechanism for discontinuity is seen to be somewhat immaterial. Mode vectors corresponding to first layer singularities show littler or no dependence on the parameters of the problems. (Author)

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A079 657/3 PC **A03**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Atomic and Molecular Gas Phase Spectrometry.
Final scientific rept. 1 Sep 75-30 Sep 79,
James D. Winefordner. 1979, 45p AFOSR-TR-79-1315
Contract F44620-76-C-0005

The research is divided into combustion diagnostics and analytical gas phase atomic and molecular spectrometry. New and improved techniques to spatially and temporally measure flame gas temperatures and species have been and are being developed. These techniques are all based upon fluorescence detection. By measuring the ratio of two fluorescence transitions (in a probe, such as indium) excited with two different wavelengths, the flame temperature can be measured with a precision and accuracy better than 50 K. The two main temperature techniques developed depend upon either the linear relationship between Fluorescence and the excitation flux on the approach to saturation of the fluorescence with high excitation fluxes. The measurement of total species concentrations in flames and fluorescence quantum efficiencies is readily performed by measurement of the absolute fluorescence flux reaching a calibrated detector as a function of absolute laser flux. A rather simple graphical method allows both species concentration and species fluorescence quantum efficiencies to be measured.

AD-A079 741/5 Not available NTIS
Combustion Inst Pittsburgh PA
Symposium (International) on Combustion (17th) held At the University of Leeds, Leeds, England, August 20-25, 1978.
1978, 1466p
Contract N00014-78-M-0053
Availability: Combustion Institute, Union Trust Bldg., Pittsburgh, PA 15219 HC$66.00 (No copies furnished by DTIC).

Contents: Plenary Lecture--Soot Formation in Combustion; Deflagration to Detonation Transition; Colloquium on Coal Combustion; Colloquium on Turbulent-Combustion Interactions; Kinetics; NO(x)SO(x); Furnace Combustion; Inhibition and Ignition; Flame Structure and Chemistry; Combustion Studies; Measurement Techniques; Colloquium on Fire and Explosion; Engine Combustion; Droplets; Combustion Oscillations; Soot; Propellants and Explosives.

AD-B010 387/9 PC **A03**/MF **A01**
Air Force AERO Propulsion Lab Wright-Patterson AFB Ohio
Laser Ignition of Titanium.
Final rept. 1 Jun 74-1 Aug 75,
Charles Elrod, Richard Rivir, and Douglas Rabe. Mar 76, 37p Rept no. AFAPL-TR-76-12
Distribution limitation now removed.

This program was directed towards the determination of using a laser as an ignition source for titanium combustion studies. A sample of titanium was located downstream from a subsonic nozzle with the edge facing the flow. The front, upper tip of the sample was ignited and allowed to burn freely aided only by the transport of oxygen by the wind tunnel. Although the pressure was ambient the air was delivered at 90 - 500 F and flow rates from Mach number .2 to Mach number .7. Sustained combustion was obtained at low Mach numbers and high temperature but not at low Mach numbers and low temperatures. The low Mach number burns were more severe than the high Mach number burns, i.e., more metal consumed before flowout. In all cases the fire progressed laterally but not significantly in the vertical direction. (Author)

N80-16058/3 PC **A03**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Infrared Measurements of a Scramjet Exhaust.
Final Report.
R. A. Reed, and M. W. Slack. Jan 80, 27p NASA-CR-3242
Contract NAS1-15395

Diagnostic 2 - 5 mm infrared spectra of a hydrogen burning scramjet exhaust were measured with an interferometer spectrometer. Exhaust gas temperatures and water vapor partial pressures were determined from the observed intensity and spectral profile of the H2O 2.7 mm infrared emission band. Overall engine combustion efficiencies were derived by combining these measurements with the known engine operating conditions. Efficiencies fall (70 - 50 percent) as fuel equivalence ratios rise (0.4 - 1.0). Data analysis techniques and sensitivity studies are also presented.

N80-16119/3 PC **A04**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
A Numerical Model of High Intensity Confined Hydrocarbon Flames.
H. A. Arbib, Y. Goldman, J. B. Greenberg, and Y. M. Timnat. Oct 78, 65p TAE-322

A computer program was developed for predicting flow field properties and species concentration distributions in side an axisymmetrical combustion chamber. A complex combuster geometry was considered, with an initial diffuser with divergence half angle of 45 degrees, and a short tunnel followed by a sudden expansion, in order to produce a strong recirculating pattern to stabilize the flame. The fuel (kerosene) and oxidant (air) emerged, premixed and in gaseous form from the central injection nozzle. A two equation model of turbulance was employed, and the complex kenetics of kerosene-air combustion by a three step global mechanism, for hydrocarbon attack, CO oxidation, and water formation are described.

PB80-128531 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Table of Recommended Rate Constants for Chemical Reactions Occurring in Combustion.
Final rept. 1950-75,
Francis Westley. Nov 79, 169p NBSIR-79-1941
Contract DOE-EA-77-A-01-0610

A table of recommended rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form

the values of the parameters for the modified Arrhenius equation k = A(T sup B)exp(-E/RT). The table covers reactions occurring in the combustion, oxidation and decomposition of aliphatic saturated or unsaturated C(1) to C(10) hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, O2, H, H2, OH, H2O, H2O2, N, N2, NO, N2O, NO2, N2O4, N2O5, S, S2, SH, SO, SO2, SOH, NS, with each other. The table includes 169 first order reactions, 782 second order reactions, and 57 third order reactions. There are 1770 entries covering 1008 distinct chemical reactions. These recommendations have been taken from eleven evaluations and critical reviews published between 1970 and 1976. The papers examined by the evaluators extend from the nineteen fifties up to - and including - 1975.

21C. Electric Propulsion

N80-16096/3 PC **A10**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Electric Propulsion for Near-Earth Space Missions.
Final Report, Feb. 1978 - Apr. 1979.
C. H. Terwilliger, and W. W. Smith. Jan 80, 206p
NASA-CR-159735, D180-25475-1
Contract NAS3-21346

A set of missions was postulated that was considered to be representative of those likely to be desirable/feasible over the next three decades. The characteristics of these missions, and their payloads, that most impact the choice/design of the requisite propulsion system were determined. A system-level model of the near-Earth transportation process was constructed, which incorporated these mission/system characteristics, as well as the fundamental parameters describing the technology/performance of an ion bombardment based electric propulsion system. The model was used for sensitivity studies to determine the interactions between the technology descriptors and program costs, and to establish the most cost-effective directions for technology advancement. The most important factor was seen to be the costs associated with the duration of the mission, and this in turn makes the development of advanced electric propulsion systems having moderate to high efficiencies (50 percent) at intermediate ranges of specific impulse (approximately 1000 seconds) very desirable.

N80-16097/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Upper Stages Utilizing Electric Propulsion.
D. C. Byers. 1980, 21p NASA-TM-81412, E-330
Conf-Presented at the Jannaf Propulsion Meeting, Monterey, Calif., 11-13 Mar. 1980.

The payload characteristics of geocentric missions which utilize electron bombardment ion thruster systems are discussed. A baseline LEO to GEO orbit transfer mission was selected to describe the payload capabilities. The impacts on payloads of both mission parameters and electric propulsion technology options were evaluated. The characteristics of the electric propulsion thrust system and the power requirements were specified in order to predict payload mass. This was completed by utilizing a previously developed methodology which provides a detailed thrust system description after the final mass on orbit, the thrusting time, and the specific impulse are specified. The impact on payloads of total mass in LEO, thrusting time, propellant type, specific impulse, and power source characteristics was evaluated.

21D. Fuels

AD-A080 072/2 PC **A02**/MF **A01**
Department of Energy Bartlesville OK Bartlesville Energy Technology Center
Thermodynamics of Organic Compounds.
Final technical summary rept. 1 Oct 78-30 Sep 79,
William D. Good, Donald W. Scott, Norris K. Smith, Susan Lee-Bechtold, and Ann G. Osborn. 1979, 19p AFOSR-TR-80-0076
Grant AFOSR-ISSA-79-0007

Measurements were completed of the enthalpy of combustion of the ramjet fuel RJ-6. Measurements of the enthalpy of combustion of hexacyclic exo,exo-dihydrodinorbornadiene, hexacyclic endo,endo-dihydrodinorbornadiene and exo-tetrahydrodicyclopentadiene are in progress. Vapor pressure measurements were made on exo-tetrahydrodicyclopentadiene. Synthesis and purification of alkylindans and alkylnaphthalenes with high steric interactions continue at Oklahoma State University. (Author)

AD-A080 085/4 PC **A11**/MF **A01**
South Carolina Univ Columbia Belle W Baruch Inst for Marine Biology and Coastal Research
Proceedings of Conference on Oil Tanker Transportation: An Interdisciplinary Analysis of National and International Policy and Practice Held at Georgetown, South Carolina on 8-10 November 1978,
E. John Vernberg, Ernest B. Altekruse, and Shirley Oakes Butler. 1978, 250p
Contract DOT-PS-80600

Partial Contents: The Role of the Tanker Industry in Transport of Energy Resources--Crude Oil and The Energy Crisis, What is the Tanker Industry, Tanker Demand Models; Protection of the Marine Environment--Marine Pollution-How Big a Problem, Environmental and Socioeconomic Effects of Oil Pollution Incidents; Pollution Prevention Initiatives and Tankers--California State Activities Related to Tanker Safety and Pollution Abatement, The Environment and Navigational Freedoms, Sources of Initiatives Designed to Prevent Pollution by Tankers; Overview of Transportation of Oil and Natural Gas by Tankers in Alaskan Waters; and Impact of New Laws and Regulations on the Tanker Industry--Pollution Prevention Rules and Tankers-Putting Requirements into Practice, Liability and Damage Compensation for Tanker Oil Spills, New Technology in Shipping Crude Oil and Refined Products.

AD-B014 581/3 PC **A03**/MF **A01**
Air Force AERO Propulsion Lab Wright-Patterson AFB Ohio
Combustion Tests of RJ-5 Fuel Blends.
Final rept. Feb-Jul 76,
R. R. Craig, J. Petrarca, J. T. Hojnacki, and P. L. Buckley. Aug 76, 32p Rept no. AFAPL-TR-76-54
Distribution limitation now removed.

An experimental investigation was conducted on the addition of viscosity reducing additives to RJ-5 fuel. The tests were to determine if the additives hindered or improved the combustion efficiency of the basic RJ-5 fuel. The tests were conducted in a 12 inch diameter dump combustor with a L/D of 4, no flameholder and a 50% nozzle at three different inlet air temperatures. The fuels employed for the tests were JP-4, RJ-5, SI-80 (20% isobutylbenze and 80% RJ-5) and HDF-2 (21% exo-tetrahydrodicyclopentadiene and 79% RJ-5). At inlet air temperatures of 750 R pronounced differences in combustion efficiencies were observed for the four fuels. As the inlet air temperature was raised to 1250 R, these differences tended to become greatly diminished. (Author)

21E. Jet and Gas Turbine Engines

AD-A079 617/7 PC **A03**/MF **A01**
Iowa State Univ Ames Engineering Research Inst
Aerodynamics of Advanced Axial-Flow Turbomachinery.
Annual rept. 1 Oct 78-30 Sep 79,
George K. Serovy, Patrick Kavanagh, Theodore H. Okiishi, and Elmer C. Hansen. Nov 79, 50p
ISU-ERI-AMES-80060, TCRL-14, AFOSR-TR-79-1325
Contract F49620-79-C-0002

A multi-task research program on aerodynamic problems in advanced axial-flow turbomachine configurations is being carried on at Iowa State University. The elements of this program are intended to contribute directly to the improvement of compressor, fan, and turbine design methods. Experimental efforts in intrapassage flow pattern measurement, unsteady blade row interaction, and control of secondary flow are included, along with computational work on inviscid-viscous interaction blade passage flow techniques. This first Annual Report summarizes progress to date and indicates the direction of each task for the immediate future. (Author)

AD-A079 681/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration Cleveland OH Lewis Research Center
Computer Program for Generating Input for Analysis of Impingement-Cooled, Axial-flow Turbine Blade.
Technical paper,
David Rosenbaum. Jan 80, 56p NASA-E-105, NASA-TP-1603, USAAVRADCOM-TR-79-34

A computer program called TACTGRID has been developed that generates the geometrical input for the TACT1 program, a program that calculates transient and steady-state temperatures, pressures, and cooling flows in an impingement-cooled turbine blade. Using spline curves, the TACTGRID program constructs the blade internal geometry from the previously designed external blade surface and newly selected wall and channel thicknesses. TACTGRID generates the TACT1 calculational grid, calculates arc lengths between grid points required by TACT1 as input, and prepares the namelist input data set used by TACT1 for the blade geometry. In addition, TACTGRID produces a scaled computer plot of each blade slice, detailing the grid and calculational stations, and thus eliminates the need for any intermediate drafting. (Author)

AD-A079 878/5 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Velocity Profiles in a Long Inlet Duct Employing a Photon Correlating Laser Velocimeter Without Seeding.
Master's thesis,
Harley J. V. Rogers. Dec 79, 169p Rept no. AFIT/GAE/AA/79D-16

This thesis involves a practical application of the Malvern Laser Velocimeter System (LV). In this work, the LV was used to measure mean velocity profiles across the inside diameter of a duct which supplies air to the compressor of jet engine. The engine, which is a General Electric J-85 turbo-jet engine is located in the Propulsion Laboratories of Wright-Patterson Air Force Base in Ohio. In addition to the mean velocity profiles, the LV was used to measure turbulence intensity profiles across the inside diameter of the duct at each of the three test points. To analyse the quality of the LV data as obtained, alternate mean velocity profiles and turbulence intensity profiles were obtained with the aid of a Hot Wire Anemometer System and a Pitot-Static Tube. During each of the traverses, or tests, with the LV System, the Hot Wire System and the Pitot-Static Tube, the engine was held at a fixed RPM, being 50% or 70% of maximum engine RPM. Good correlation was achieved between each of the three systems in respect to the mean velocity profiles obtained at each of the three test positions while the turbulence intensity profiles matched well in the regions of the flow where turbulence levels of 2% to 30% encountered. (Author)

AD-B003 520/4 PC **A12**/MF **A01**
Naval Air Development Center Warminster PA Air Vehicle Technology Dept
NEPCOMP - The Navy Engine Performance Computer Program, Version I.
Final rept.,
Michael J. Caddy, and Stanley R. Shapiro. 15 Apr 75, 251p Rept no. NADC-74045-30
Distribution limitation now removed.

A general purpose computer program is described which permits rapid design point and off design performance analyses of air breathing engines. The modular approach used in building the overall program allows analysis of many engine configurations including multi-stream, multi-nozzle, augmented engines, shaft engines and ramjets. The program may be operated with or without component maps. The result is a computational tool that can be used to perform independent analyses of an engine manufacturer's product as well as provide engine performance data for use in engine-airframe design and integration studies. (Author)

AD-B014 875/9 PC **A10**/MF **A01**
United Technologies Corp Sunnyvale Calif Chemical Systems Div
Generic Ordnance Ramjet Engine (GORJE) Fuel Tank.
Final rept. Jul 74-Jan 76,

T. C. Warren. Oct 76, 213p NWC-TP-5835, GIDEP-E069-2686
Contract N00123-74-C-1357
Also available as Rept. no. GIDEP-805.30.20.70-X7-01.
Distribution limitation now removed.

This report discusses the design, analysis, fabrication, testing, and delivery of positive expulsion fuel tank assemblies for the generic ordnance ramjet engine (GORJE). The program was conducted in two phases: Phase I Task I encompassed the design and analysis of a tank assembly satisfying the basic GORJE requirements. This assembly consisted of a 4130 steel tank with a reinforced elastomeric positive expulsion bladder that contains the ramjet fuel and collapses around a central collector pipe that houses the fuel delivery gas generator and flow control valve. Phase I Task II involved the fabrication and test of one ground test tank with a spare collector pipe and six expulsion bladders. This ground test tank was delivered to NWC for testing purposes. Phase II involved the fabrication, checkout, and delivery of four flight test units to NWC for use in the GORJE flight test program. This program was concluded with a detailed manufacturing cost analysis of the tank assembly in quantities up to 2,000 units. (Author)

AD-B022 460/0 PC **A04**/MF **A01**
General Electric CO Lynn Mass Aircraft Engine Group
YJ101-YF-17 Aircraft Prototype Development Summary.
Final rept. Mar 72-Dec 75,
G. G. Lail, and J. H. Pennell. Jan 77, 56p
R77AEG012, AFAPL-TR-77-18
Contract F33657-75-C-0010
Distribution limitation now removed.

In the time period from 1970 to early 1975, the Air Force funded development of the YJ101 prototype engine for use in Northrop, YF-17, Lightweight Fighter Prototype. The engine passed a Prototype Preliminary Flight Rating Test (PPFRT) in early 1974. Flight testing of the YF-17 with YJ101 engines was terminated in early 1975 after a total of 288 aircraft flights for a total of 691 engine flight hours and 2455 total engine test hours. At the completion of the YJ101 Prototype Development Program the USAF funded a one year Continuing Engineering Program. The purpose of this program was to organize and rationalize prototype engine development experience and data into sound technical programming and fiscal information and to investigate and fundamentals of engine development practices. This report summarizes the results of the earlier Prototype Development effort and the flight test program and discusses the results and conclusions of the Continuing Engineering Program. (Author)

AD-B023 566/3 PC **A07**/MF **A01**
Ford Motor CO Dearborn Mich
Brittle Materials Design, High Temperature Gas Turbine.
Interior rept. no. 11, 1 Jul-31 Dec 76,
A. F. McLean, and E. A. Fisher. Aug 77, 136p
AMMRC-CTR-77-20
Contract DAAG46-71-C-0162, Grant ARPA Order-1849
Distribution limitation now removed.

The demonstration of uncooled brittle materials in structural applications at 2500 F is the objective of the 'Brittle Materials Design, High Temperature Gas Turbine' program. Ford Motor Company, the contractor, is utilizing a small vehicular gas turbine comprising an entire ceramic hot flow path including the highly stressed turbine rotors. Westinghouse, the subcontractor, originally planned to evaluate ceramic first stage stator vanes in an actual 30MW test turbine engine; however, this objective was revised to demonstrate ceramic stator vanes in a static test rig. Both companies had in-house research programs in this area prior to this contract. In the stationary gas turbine project, the test of ceramic stator vanes in a static rig for 100 cycles up to temperatures of 2500 F has been completed. This accomplishment meets the revised objectives for the stationary turbine project and, therefore, this project was completed. Fabrication of duo-density silicon nitride turbine rotors continued during this reporting period. The injection molding of duo-density rotor blade rings has been improved by the addition of a solid state automatic control system which was installed on the injection molding machine. Fabrication of turbine inlet nose cones and stators was resumed on a limited basis. In order to select the best method of processing Si3N4 powder, the optimum Mg0 content and the best hot pressure parameters consistent with the hub forming portion of the duo-density rotor process, a parametric processing study was conducted. A technique was developed which allows the furnace to control the nitriding dependent upon the nitrogen gas consumption rate, resulting in improved material structure.

AD-B023 874/1 PC **A07**/MF **A01**
Naval Weapons Center China Lake Calif
Additive Drag of Two-Dimensional Inlets.
Final rept. Sep 69-Jun 77,
Robert B. Hall. Nov 77, 135p Rept no. NWC-TP-5951
Distribution limitation now removed.

A theoretical analysis of additive drag of two-dimensional inlets has been performed. A preliminary review of supersonic inlets provides a description of the various types of inlets, an introduction to inlet terminology and performance criteria, and the definition of additive drag. The application of geometrical streamline tracing is introduced for simple geometries as a method of determining inlet capture area ratio. The spillage from the sides of a two-dimensional inlet is treated by the method of homogeneous conical flows. This method is described and extended to determine the three-dimensional perturbation velocities within the conical flowfield. A computer program has been written to determine the shape of the streamtube captured by the inlet. In addition to tracing the streamlines, the program also numerically integrates the pressures over the streamtube to calculate the additive drag with sidespillage. The computer program has been applied to several inlet designs. Comparisons of spillage are made with experimental data. The effects of various inlet variables are considered. These variables include ramp angle, Mach number, presence of sidewalls, and leading edge sweepback. (Author)

N80-16061/7 PC **A16**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Core Noise Investigation of the CF6-50 Turbofan Engine.
Data Report, 1978 - 1979.
V. L. Doyle. Jan 80, 357p NASA-CR-159598, R79AEG247
Contract NAS3-21260

Acoustic data obtained during the running of the CF6-50 turbofan engine on an outdoor test stand are presented. The test was conducted to acquire simultaneous internal and far-field measurements to determine the influence of internally generated noise on the far-field measurements. The data includes internal and far-field narrowband and one-third octave band pressure spectra.

N80-16062/5 PC **A22**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Core Noise Investigation of the CF6-50 Turbofan Engine.
Final Report.
V. L. Doyle, and M. T. Moore. Jan 80, 520p
NASA-CR-159749, R79AEG395
Contract NAS3-21260

The contribution of the standard production annular combustor to the far-field noise signature of the CF6-50 engine was investigated. Internal source locations were studied. Transfer functions were determined for selected pairs of combustor sensors and from two internal sensors to the air field. The coherent output power was determined in the far-field measurements, and comparisons of measured overall power level were made with component and engine correlating parameters.

N80-16063/3 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Expanded Study of Feasibility of Measuring In-Flight 747/Jt9d Loads, Performance, Clearance, and Thermal Data.
G. P. Sallee, and R. L. Martin. 4 Feb 80, 107p
NASA-CR-159717, PWA-5512-46
Contract NAS3-20632

The JT9D jet engine exhibits a TSFC loss of about 1 percent in the initial 50 flight cycles of a new engine. These early losses are caused by seal-wear induced opening of running clearances in the engine gas path. The causes of this seal wear have been identified as flight induced loads which deflect the engine cases and rotors, causing the rotating blades to rub against the seal surfaces, producing permanent clearance changes. The real level of flight loads encountered during airplane acceptance testing and revenue service and the engine's response in the dynamic flight environment were investigated. The feasibility of direct measurement of these flight loads and their effects by concurrent measurement of 747/JT9D propulsion system aerodynamic and inertia loads and the critical engine clearance and performance changes during 747 flight and ground operations was evaluated. A number of technical options were examined in relation to the total estimated program cost to facilitate selection of the most cost effective option. It is concluded that a flight test program meeting the overall objective of determining the levels of aerodynamic and inertia load levels to which the engine is exposed during the initial flight acceptance test and normal flight maneuvers is feasible and desirable. A specific recommended flight test program, based on the evaluation of cost effectiveness, is defined.

PAT-APPL-6-082 354 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Hot Spike Mixer.
Patent Application,
David O. Wright. Filed 5 Oct 79, 8p AD-D006 821/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A mixer at the exit opening of a high performance jet engine to prevent premature migration of the core flow into the duct stream thereby operating to eliminate hot streaks in the augmentor and nozzle areas during augmentation is described. The mixer consists of a concave fillet positioned on the pressure side of the turbine exit guide vane and exhaust case at the trailing edge. (Author)

PAT-APPL-6-088 503 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Broad Spectrum Vibration Damper Assembly Fixed Stator Vanes of Axial Flow Compressor.
Patent Application,
Carmen B. Jones. Filed 26 Oct 79, 18p AD-D006 825/4
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Undesirable vibrations of stator airfoil vanes circumferentially disposed in annular rows, and fixed at their ends by a sectored outer shroud and a sectored inner shroud, in an axial flow compressor of gas turbine engine are damped by a damper assembly that is fitted into, and is frictionally engaged, in the sectored inner shroud which, in turn, is segmented to assist in this damping. The damper assembly includes: A metal seal strip member having indentations; a metal sine wave-shaped damper and spring member that is complementary to, and is engaged with, the seal strip member; and, a honeycomb member affixed to the bottom surface of the seal strip member. The vibrations cause movement of the shroud segments which, in turn, cause rubbing contact; and, the resulting friction heat energy is conducted through the metal components of the damper assembly to the thermal sink that is the through-flowing air in the compressor. (Author)

PAT-APPL-6-091 220 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Cooling System for Ramjet Engine.
Patent Application,
M. Brian Bergsten. Filed 5 Nov 79, 7p AD-D006 830/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a ramjet powered vehicle having a bleed slot in the subsonic diffuser, for the

ramjet combustor, which supplies air to a turbine for supplying power to vehicle accessories. A vortex tube is provided between the bleed slot and the turbine to provide a cool air supply. Radar absorbing material is positioned adjacent ramjet inlet with a cooling duct provided to supply cooling air from the vortex tube to the ramjet inlet cowl lip to provide cooling for the radar absorbing material. (Author)

PATENT-4 183 720 Not available NTIS
Department of the Air Force Washington DC
Composite Fan Blade Platform Double Wedge Centrifugal Seal.
Patent,
James W. Brantley. Filed 3 Jan 78, patented 15 Jan 80, 5p AD-D006 839/5, PAT-APPL-866 726
Supersedes PAT-APPL-866 726-78, AD D004 691.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A sealing arrangement for preventing compressor fan air loss through the relatively wide gaps between adjacent blade platforms required in order to allow for rotation of the blades around their minor root axes in response to bird impact and the like. A thin flexible ribbon-like seal is bonded to one of the two adjacent blade platforms in the fan structure. At the gap, the seal includes a thickened wedge shaped portion with at least one invagination on the inner side facing the rotor axis. At the operating speed of the compressor fan, centrifugal force causes the thickened portion to be forced into the gap between adjacent platforms producing the required seal. (Author)

PATENT-4 185 458 Not available NTIS
Department of the Air Force Washington DC
Turbofan Augmentor Flameholder.
Patent,
Richard C. Ernst. Filed 11 May 78, patented 29 Jan 80, 5p AD-D006 847/8, PAT-APPL-904 850
Supersedes PAT-APPL-904 850-78, AD-D005 066.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A turbofan augmentor flameholder having a hollow ring-like structure of annular configuration concentric with the center line of a turbine of a turbofan engine. The ring-like structure has protruding therefrom in the radial direction a first group of hollow gutters extending in a direction toward the center line of the turbine and a second group of hollow gutters extending from the ring-like structure in a direction away from the center line and toward the outer casing of the turbofan engine. The second group of gutters have a vee-shaped angular configurated portion in a direction toward the turbine. The angular configurated portion gradually increases in angle along the gutter in the radial direction as a direct function of its distance from the ring-like structure. Such a relationship provides optimum efficiency for the dispersion of hot exhaust gases from the turbine to the flameholder for gas turbofan engine augmentation. (Author)

PATENT-4 185 461 Not available NTIS
Department of the Air Force Washington DC
Turbojet Engine with Combustor Bypass.
Patent,
David B. Wilkinson. Filed 10 Jan 78, patented 29 Jan 80, 3p AD-D006 848/6, PAT-APPL-868 359
Supersedes PAT-APPL-868 359-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A propulsion system having an afterburning turbojet with the fuel supplied at the inlet to the turbojet compressor. The turbojet combustor has a bypass with a flow control connected at the inlets to the combustor and the bypass to control the amount of fuel-air mixture from the comprssor that enters the combustor. (Author)

21H. Rocket Motors and Engines

AD-A079 647/4 PC **E16**/MF **E16**
Johns Hopkins Univ Laurel MD Chemical Propulsion Information Agency
JANNAF Plume Technology Meeting (11th) Volume II.
Meeting bulletin,
Theodore M. Gilliland. Jul 79, 245p Rept no. CPIA-PUB-306-VOL-2
Contract N00024-78-C-5384
See also Volume 1, AD-B041 818.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20810 HC $24.50 (No copies furnished by DTIC).

The unclassified papers presented at the meeting are contained in two volumes. The classified papers are being published and distributed by MIRADCOM, Redstone Arsenal, Alabama. This volume contains public release papers concerning exhaust plume flow field property measurements and predictions and IR radiation. (Author)

AD-A079 703/5 PC **A10**/MF **A01**
Rockwell International Canoga Park CA Rocketdyne Div
Liquid Oxygen/Liquid Hydrogen Auxiliary Propulsion System Thruster Investigation.
Final rept. Oct 76-Feb 79,
E. E. Eberle, and L. Kusak. Dec 79, 210p RI/RD79-217, NASA-CR-159674
Contract NAS3-20373

This program encompassed the design, fabrication, and demonstration of a 111 newton (25 lb) thrust, integrated auxiliary propulsion system (iaps) thruster for use with LH2/LO2 propellants. Hydrogen was supplied at a temperature range of 22 to 33 K (40 to 60 R), and oxygen from 89 to 122 K (160 to 220 R). The thruster was designed to operate in both pulse mode and steady-state modes for vehicle attitude control, space maneuvering, and as abort backup in the event of failure of the main propulsion system. A dual-sleeve, tri-axial injection system was designed that utilizes a primary injector/combustor where 100% of the oxygen and 8% of the hydrogen is introduced; a secondary injector/combustor where 45% of the hydrogen is introduced to mix with the primary combustor gases; and a boundary layer injector that uses the remaining 45% of the hydrogen to cool the thrust throat/nozzles region. Hot-fire evaluation of this thruster with an BLC injection distance of 2.79 cm (1.10 in.) indicated that a specific impulse value of 390 sec can be attained using a coated molybdenum thrust chamber. Pulse mode tests indicated that a chamber pressure buildup to 90% thrust can be achieved in a time on the order of 48 msec. Some problems were encountered in achieving ignition of each pulse during pulse trains. This was interpreted to indicate that a higher delivered spark energy level (>100 mJ) would be required to maintain ignition reliability of the plasma torch ignition system under the extra 'cold' conditions resulting during pulsing. (Author)

AD-A079 857/9 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Experimental Study of Static Thrust Augmentation Using a 2-D Variable Ejector.
Master's thesis,
Eli Kedem. Dec 79, 97p Rept no. AFIT/GAE/AA/79D-7

A short rectangular throat ejector was constructed and tested to determine the effects of a number of variables on thrust augmentation and mass augmentation. The variables included those associated with geometry (e.g., diffuser length/throat length, diffuser area ratio, diffuser sidewall angle, nozzle angles and positions) and those due to differences in primary mass flow rate distributions among the nozzles. There were two kinds of thrust augmentation that were calculated; the free thrust augmenting ratio and the isentropic thrust augmenting ratio. The free thrust augmenting ratio is the ratio of the ejector's measured thrust to the sum of the nozzles' measured thrust, if each of them were discharged separately to ambient pressure. The isentropic thrust augmenting ratio is the ratio of the ejector's measured thrust to the calculated thrust of the nozzles if discharged isentropically to the ambient pressure. A free thrust augmentating ratio as high as 1.63 and an isentropic thrust augmenting ratio of up to 1.29 were obtained. Mass augmentation which is the ratio of secondary flow to primary flow was in the range of 3.5 to 5. Some conclusions concerning design aspects were drawn also. They include the necessity of 3-D shrouding for the ejector's inlet and exit and the prevention of blowing high velocity air (primary and BLC flow) tangential to the ejector walls. (AUthor)

AD-A079 986/6 PC **A04**/MF **A01**
IIT Research Inst Chicago IL
Initiation Mechanisms of Solid Rocket Propellant Detonation.
Interim rept. no. 4 (Final) 1 Jan 75-30 Sep 79,
A. N. Takata. Nov 79, 59p IITRI-J6352-FR,
AFOSR-TR-79-1324
Contract F44620-75-C-0059

The purpose of this study is to identify mechanisms responsible for several accidental detonation of high-energy solid rocket propellant motors. During the past year a computer model was developed to predict the amount of foam or melt generated in cracks following sudden exposure of the crack to a cavity containing higher temperature/pressure gases than exists within the crack. In addition an experimental design was developed to study deflagration to detonation transitions (DDT). Analytical predictions suggest that DDT can occur as a consequence of burning propellant cracks provided molten propellant is generated within the burning propellant cracks and the cracks are subjected to sufficiently high amplitude stress waves. The stronger the stress waves are, the less the amount of melt needed for DDT. DDT can be initiated by single burning cracks in close proximity to the motor case, or by multiple burning cracks which are similarly oriented by respect to each other and closely spaced. (Author)

AD-A080 037/5 MF **A01**
United Technologies Research Center East Hartford CT
Beamed Energy Coupling Studies.
Final technical rept. 1 Jun 77-31 May 79,
M. C. Fowler, L. A. Newman, and D. C. Smith.
Jan 80, 134p UTRC/R79-922895-25, AFRPL-TR-79-51
Contract F04611-77-C-0039
Availability: Microfiche copies only.

This report describes the analytical and experimental results of a study to determine the feasibility of using molecular seeds to couple CO2 laser radiation and CO laser radiation to the working fluid, H2, of a high performance rocket thruster. The gas mixtures studied experimentally were H2/H2O, H2/D2O, and H2/NH3 at CO2 laser wavelengths. The promise of CO as an absorber of CO laser radiation was established analytically. To attain the high temperatures, 1000-6000K, desired, these mixtures were placed in a cell positioned in a diagnostic apparatus which determined the spatial variation of the mixture absorption coefficient and temperature about the axis of a hot, dense plasma sustained by focused high power CW CO2 laser radiation. The measurements on these mixtures indicated their performance as couplers to exceed expectations created by the analytical study. In addition, it was found that in the absence of plasma, the temperature of the mixtures could be raised to temperatures as high as 2000-4000K simply by absorption by the mixture of laser energy at the high power beam focal spot to create the observed laser sustained flame. Further work is needed to determine the conditions under which this flame can be sustained in the laser energized rocket thruster. (Author)

AD-B009 765/9 PC **A08**/MF **A01**
Air Force Armament Lab Eglin AFB Fla
The Infrared Signature of the High Altitude Supersonic Target (HAST) at Sea Level.
Final rept. Jan-Jun 75,
D. B. Ebeoglu, and C. W. Martin. Aug 75, 152p Rept no. AFATL-TR-75-103
Distribution limitation now removed.

Detailed measurements of the infrared signature of the High Altitude Supersonic Target (HAST) hybrid rocket engine have been obtained for the first time at sea level and at several measured O/F ratios

representing its entire operating range. Secondary injection, as an infrared signature augmentation technique, has been evaluated on both the full-scale HAST engine and a special subscale model. The latter has also been operated with subsonic envelopes of inert gas (nitrogen) and air to eliminate or reduce the effect of afterburning as a radiation mechanism. The infrared measurements show excellent correlation between full-scale and subscale total radiation and also indicate that maximum radiation per unit area remains constant at beam aspect. It has been determined that the HAST hybrid engine infrared radiation is surface area dependent, varies linearly with flow rate, and is affected primarily by O/F ratio. These measurements have permitted closer evaluation of in-flight performance and have resulted in realistic recommendations for a HAST augmentation technique. (Author)

AD-B010 287/1 PC **A06**/MF **A01**
Mcdonnell Douglas Astronautics CO Huntington Beach Calif
AN Analytical Study of a Boundary Layer TVC Nozzle Concept.
Final rept. 28 Oct 74-28 Jul 75,
H. H. Tang, W. A. Anderson, and J. Xerikos. Mar 76, 117p MDC-G6027, NWC-TR-5788
Contract N00123-75-C-0595
Distribution limitation now removed.

Experimental investigations of the feasibility of directing missile thrust by controlling ambient airflow through ports in overexpanded nozzles have been conducted by the Naval Weapons Center and an NWC-sponsored contractor. Chandler Evans, Inc. The present analytical effort studied boundary-layer thrust vector control (BLTVC) technology with the following specific objectives: (1) Development of analytical or semi-empirical descriptions of the dominant phenomena that characterize the BLTVC flow field; (2) Derivation of similarity parameters that affect BLTVC performance; (3) Development of preliminary guidelines for flight-environment simulation with ground experiments; and (4) Generation of design charts that would be useful for BLTVC performance evaluation. The results of the study include identification of areas that require investigation in order to establish a design suitable for mission applications. (Author)

21I. Rocket Propellants

AD-A079 618/5 PC **A03**/MF **A01**
Atlantic Research Corp Alexandria VA Research and Technology Div
Experimental and Analytical Study of Erosive Burning of Solid Propellants.
Interim rept. 1 Oct 78-30 Sep 79,
Merrill K. King, Robert Beddini, Mohan Razdan, and Kenneth Kuo. Nov 79, 43p AFOSR-TR-79-1323
Contract F49620-78-C-0016

At Atlantic Research, erosive burning characteristics of eleven composite propellants were measured and found to agree well with predictions of a simplified first-generation model under most conditions. A second-generation more fundamental model for predicting burning rate versus pressure and cross flow velocity, given only compositional data, also yield predictions in close agreement with data. The most important parameter affecting crossflow sensitivity was no-cross flow burning rate, erosion sensitivity decreasing with increasing base rate. ARAP completed modifications to its SPEC model to enable calculation of cylindrical flows and performed preliminary evaluation for cold-flow simulations and erosive burning. Motor port diameter was identified as a key erosive burning scaling parameter through its effect on threshold conditions, and a simplified scaling relation was developed and verified. In addition, ARAP investigated the effects of combustion-turbulence interaction on predicted erosive burning. Penn State measured erosive burning rates of three AP-composite formulations in a device designed to give a well-defined turbulent boundary layer. The data agreed well with predictions made using a Penn State model based on a 2D turbulent boundary layer approach. Correlations relating burning rate to free stream velocity, and pressure were developed. The model was also extended to axisymmetric cylindrical port flow. (Author)

AD-A079 791/0 PC **A12**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
Burning Velocities of a Solid Propellant, via a Microwave Technique, at Elevated Pressures and Pressurization Rates.
Rept. for 1976-1978,
L. H. Russell. Oct 79, 269p Rept no. NSWC/TR-79-378

Presented are the results of a research effort to directly measure, via a microwave Doppler/phase shift technique, the burning rate of solid propellant in both steady and dynamic elevated pressure environments. The recession velocity of the propellant when it burned planarly within a small rectangular waveguide was directly proportional to the time rate of change of a measured relative phase angle. This relative phase angle was based upon the phase relationship between guided microwave reflections from two surfaces, one a reference plane and the other an effective plane created by the dielectric discontinuity at the burning propellant surface. In the pressure range from 500 to 10,000 psig, steady-state burning rate tests with a single base nitrocellulose gun propellant, M6, were sucessfully conducted in a large volume combustion fixture which incorporated a coaxial-to-waveguide adapter having unique pressure sealing microwave feedthroughs. in addition to yielding burning rate values intermediate to those from conventional closed chamber and strand burner tests, the experiments established the uncertainty in the proportionality constant linking M6 burning rate and the time derivative of relative phase angle. A one-dimensional theoretical model was formulated and, with the aid of appropriately chosen constants, yielded predictions which agreed very well with the experimentally observed behavior of a solid propellant undergoing planar burning with a waveguide.

AD-A079 996/5 PC **A13**/MF **A01**
Thiokol Corp Huntsville AL Huntsville Div
Fourier Transform Infrared Spectroscopy (FTIS). Volume I. Technical Report.
Final rept. Apr 78-Dec 79,
W. W. Schwarz. Dec 79, 279p U-79-18-VOL-1, AFRPL-TR-79-91-VOL-1
Contract F04611-78-C-0027
See also Volume 2, AD-A079 997.

This is the final report of a contract to establish the relationship between infrared spectra and propellant aging and to determine the applicability of this relationship to the prediction of service life of propellants. Equipment for measurement of infrared specta by both attenuated total reflectance and through transmission was identified, and procedures for sample preparation and testing were developed and demonstrated. Computer programs for reducing the infrared spectra data and statistically analyzing them were developed and made operational on the CDC 6600 computer at the Air Force Rocket Propulsion Laboratory. Aging programs were conducted for two composite solid propellants, and the correlations between their infrared spectra and tensile properties as aging progressed were determined. Equations were established for the prediction of future tensile properties from spectral properties acquired during aging. The major accomplishments of this project are the establishment of methods for predicting propellant tensile properties from infrared spectral data during storage and the development of procedures and computer programs for rapidly and economically processing large amounts of infrared data. The results of this project are a major step toward predicting the remaining shelf life of solid propellant rocket motors from infrared measurements using small amounts of propellant associated with them. Recommendations for application of these results and for improving and extending the developed methods are included in the report.

AD-A079 997/3 MF **A01**
Thiokol Corp Huntsville AL Huntsville Div
Fourier Transform Infrared Spectroscopy (FTIS). Volume II. User's Manual.
Final rept. Apr 78-Dec 79,
W. W. Schwarz, and O. C. Smith. Dec 79, 220p U-79-18-VOL-2, AFRPL-TR-79-91-VOL-2
Contract F04611-78-C-0027
See also Volume 1, AD-A079 996.
Availability: Microfiche copies only.

This is the final report to establish the relationship between infrared spectra and propellant aging and to determine the applicability of this relationship to the prediction of service life of propellants. This document (Volume II - User's Manual) describes the two computer programs E410 and E490 that were developed in order to reduce and statistically analyze the infrared spectral data. The version of these two codes decribed herein was made operational on the CDC 6600 computer at the Air Force Rocket Propulsion Laboratory. With minor modifications to these two FORTRAN codes themselves, along with the appropriate job control language, both E410 and E490 can also be made operational on an IBM 360/370 computer system.

N80-16299/3 PC **A03**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Homogeneous Vortex Model for Liquid Slosh in Spinning Spherical Tanks.
M. El-raheb, and P. Wagner. 15 Nov 79, 46p NASA-CR-162725, JPL-PUB-79-99
Contract NAS7-100

The problem of forced fluid sloshing in a partially filled spinning spherical tank is solved numerically using the finite element method. The governing equations include Coriolis acceleration, empirical fluid damping and spatially homogeneous vorticity first introduced by Pfeiffer. An exponential instability similar to flutter is detected in the present simulation for fill ratios below 50 percent. This instability appears in the model as a result of the homogeneous vortex assumption since the free slosh equations are neutrally stable in the Liapunov sense.

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A079 638/3 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
Spacecraft Test Chamber Contamination Study in the AEDC Mark I Facility.
Final rept. Apr-Jul 77,
J. G. Pipes, D. F. Frazine, R. P. Young, E. N. Borson, and L. H. Rachal. Jan 80, 26p Rept no. AEDC-TR-79-41
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Recent results of a contamination study in the Arnold Engineering Development Center Mark I space simulation chamber are presented. The measurements were associated with the Global Positioning System satellite test conducted in the Mark I facility between April 6, 1977, and July 24, 1977. Multiple internal reflection spectroscopy (MIRS) internal reflection elements (IRE's), thermal control surface witness plates, and quartz crystal microbalances (QCM's) were used to measure contaminants condensible during an extended chamber evacuation. An automatic particle counter was used to measure airborne particle density when the chamber was at atmospheric pressure. The nonvolatile residue wipe technique was employed to determine the general cleanliness of the chamber hardware. Temperature of the IRE's during chamber operation was between 150 and 200 K. One QCM was temperature controlled to a temperature of 238 K; the other QCM operated at 135 K. After chamber repressurization, the IRE's were scanned in the 2- to 15- micrometer wavelength region. Resulting spectra indicated a coating of diffusion pump fluid (DC704) at a concentration level just above the limit of detectability.

AD-A079 855/3 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Use of an Aerodynamic Turn to Maximize the Orbit Inclination Change for the Space Shuttle Orbiter.
Masters thesis,
Glenn S. Geary. Dec 79, 83p Rept no. AFIT/GA/AA/79D-4

Previous studies have shown that the Space Shuttle Orbiter can achieve larger orbit inclination changes using an aerodynamic turn than can be obtained using a rocket motor burn. This analysis determines the angle of attack and bank angle histories which maximize the change in inclination

angle while satisfying final altitude and velocity loss constraints. The angle of attack and bank angle are modelled as polynomial functions of time with unknown coefficients. The optimum values of the coefficients are determined by a gradient optimization technique. Additionally, the sensitivity of the change in inclination angle to changes in the orbit apogee altitude is examined. It is shown that the Space Shuttle Orbiter can obtain higher inclination angle changes with higher apogee altitudes. (Author)

N80-16072/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mission Operation Report. Solar Maximum Mission (SMM).
11 Feb 80, 35p NASA-TM-80939, S-826-80-01

Contents: (1) scientific background; (2) mission description; (3) mission objectives; (4) observatory description; (5) experiment descriptions; (6) launch vehicle description; (7) mission support; (8) project management; and (9) SMM project costs.

22B. Spacecraft

AD-A079 931/2 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Man-Made Heavenly Palace,
Shu Tien. 18 Jul 79, 11p Rept no. FTD-ID(RS)T-0842-79
Edited trans. of Hang K'ung Chih Shih (China) n12, p27-29 Dec 78.

No abstract available.

AD-B010 087/5 PC **A17**/MF **A01**
Aerospace Corp El Segundo Calif Satellite Systems Div
A Review of Communications Satellites and Related Spacecraft for Factors Influencing Mission Success. Volume II. Appendices A, B, C.
Final rept.,
F. W. Buehl, and R. E. Hammerand. 17 Nov 75, 380p Rept no. TOR-0076(6792)-1-Vol-2
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Volume II of a three volume review of communications satellite and related spacecraft programs to identify factors influencing mission success. Includes a summary of military and commercial programs to date evaluating factors which contributed to success or failure of each. (Author)

AD-B010 123/8 PC **A07**/MF **A01**
Aerospace Corp El Segundo Calif Satellite Systems Div
A Review of Communications Satellites and Related Spacecraft for Factors Influencing Mission Success. Volume I. Analyses.
Final rept.,
F. W. Buehl, and R. E. Hammerand. 17 Nov 75, 127p Rept no. TOR-0076(6792)-1-Vol-1
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Volume 1 of a three volume review of communications satellites and related spacecraft programs to identify factors influencing mission success. Military and commercial programs are included. Factors reviewed include orbital performance, launch vehicle considerations, reliability and quality assurance programs, testing, affect of military requirements, and program management. (Author)

AD-B015 338/7 PC **A04**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB Ohio
Lincoln Experimental Satellite (8/9) Simulation.
Final rept. Aug 74-Mar 76,
John W. Mayhan, and Paul F. Humel. Sep 76, 66p Rept no. AFAL-TR-76-198
Distribution limitation now removed.

This document provides a description of the in-house work performance in the Air Force Avionics Laboratory's Communication Systems Evaluation Laboratory (CSEL) to successfully implement a Lincoln Experimental Satellite (LES 8 or 9) simulator. The work description covers both the software and hardware aspects of the simulator's implementation. (Author)

N80-16073/2 PC **A05**/MF **A01**
McDonnell-Douglas Technical Services Co., Inc., Houston, TX.
Solar Maximum Mission Panel Jettison Analysis Remote Manipulator System.
Final Report.
R. B. Bauer. Jan 80, 88p NASA-CR-162466, JSC-16333

A study is presented of the development of the Remote Manipulator System (RMS) configurations for jettison of the solar panels on the Solar Maximum Mission/Multimission Satellite. A valid RMS maneuver between jettison configurations was developed. Arm and longeron loads and effector excursions due to the solar panel jettison were determined to see if they were within acceptable limits. These loads and end effector excursions were analyzed under two RMS modes, servos active in position hold submode, and in the brakes on mode.

N80-16080/7 PC **A06**/MF **A01**
Michigan Univ., Ann Arbor.
Optimum Reentry Trajectories of a Lifting Vehicle.
Final Report.
J. S. Chern, and N. X. Vinh. Feb 80, 121p NASA-CR-3236
Grant NSG-1448

Research results are presented of an investigation of the optimum maneuvers of advanced shuttle type spacecraft during reentry. The equations are formulated by means of modified Chapman variables resulting in a general set of equations for flight analysis which are exact for reentry and for flight in a vacuum. Four planar flight typical optimum manuevers are investigated. For three-dimensional flight the optimum trajectory for maximum cross range is discussed in detail. Techniques for calculating reentry footprints are presented.

N80-16081/5 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Evaluation of Use of MPAD Trajectory Tape and Number of Orbit Points for Orbiter Mission Thermal Predictions.
R. A. Vogt. Nov 79, 126p NASA-TM-80946, JSC-16303

The application of using the mission planning and analysis division (MPAD) common format trajectory data tape to predict temperatures for preflight and post flight mission analysis is presented and evaluated. All of the analyses utilized the latest Space Transportation System 1 flight (STS-1) MPAD trajectory tape, and the simplified '136 note' midsection/payload bay thermal math model. For the first 6.7 hours of the STS-1 flight profile, transient temperatures are presented for selected nodal locations with the current standard method, and the trajectory tape method. Whether the differences are considered significant or not depends upon the view point. Other transient temperature predictions are also presented. These results were obtained to investigate an initial concern that perhaps the predicted temperature differences between the two methods would not only be caused by the inaccuracies of the current method's assumed nominal attitude profile but also be affected by a lack of a sufficient number of orbit points in the current method. Comparison between 6, 12, and 24 orbit point parameters showed a surprising insensitivity to the number of orbit points.

N80-16082/3 PC **A07**/MF **A01**
Grumman Aircraft Engineering Corp., Bethpage, NY. Research Dept.
Control of Large Space Structures.
Final Report.
R. Gran, M. Rossi, H. G. Moyer, and F. Austin. Apr 79, 134p NASA-CR-161369, RE-589
Contract NAS8-32587

The control of large space structures was studied to determine what, if any, limitations are imposed on the size of spacecraft which may be controlled using current control system design technology. Using a typical structure in the 35 to 70 meter size category, a control system design that used actuators that are currently available was designed. The amount of control power required to maintain the vehicle in a stabilized gravity gradient pointing orientation that also damped various structural motions was determined. The moment of inertia and mass properties of this structure were varied to verify that stability and performance were maintained. The study concludes that the structure's size is required to change by at least a factor of two before any stability problems arise. The stability margin that is lost is due to the scaling of the gravity gradient torques (the rigid body control) and as such can easily be corrected by changing the control gains associated with the rigid body control. A secondary conclusion from the study is that the control design that accommodates the structural motions (to damp them) is a little more sensitive than the design that works on attitude control of the rigid body only.

N80-16083/1 PC **A04**/MF **A01**
Howard Univ., Washington, DC. School of Engineering.
Study of Foldable Elastic Tubes for Large Space Structure Applications, Phase 1.
Final Report.
I. W. Jones, C. Boateng, and C. D. Williams. Jan 80, 58p NASA-CR-162652
Grant NSG-1320

Structural members that might be suitable for strain energy deployable structures, are discussed with emphasis on a thin-walled cylindrical tube with a cross-section that is called 'bi-convex'. The design of bi-convex tube test specimens and their fabrication are described as well as the design and construction of a special purpose testing machine to determine the deployment characteristics. The results of the first series of tests were quite mixed, but clearly revealed that since most of the specimens failed to deploy completely, due to a buckling problem, this type of tube requires some modification in order to be viable.

N80-16089/8 PC **A02**/MF **A01**
Remtech, Inc., Huntsville, AL.
Space Shuttle Base Heating Analysis.
Final Report.
11 Jan 80, 16p NASA-CR-161375, RTR-014-10
Contract NAS8-29270

Work performed in support of radiation and convective base heating predictions in developing the space shuttle thermal environment is described. Topics discussed include plume radiation predictions and the development of prediction methods; convective base heating predictions due to both reversed flow and direct plume impingement; and evaluation testing of a gas temperature probe used in short-duration base heating model tests.

N80-16091/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Orbiter Landing Loads Math Model Description and Correlation with Alt Flight Data.
D. A. Hamilton, J. A. Schliesing, and G. A. Zupp, Jr.. Jan 80, 27p NASA-RP-1056, JSC-16202

Results of the space shuttle approach and landing test are examined in order to assess landing gear characteristics and performance and verify landing dynamic analyses. The landing gears were instrumented with load-calibrated strain gages, a wheel-speed sensor, and strut stroke measurement devices. The mathematical procedure used in predicting the shuttle touchdown loads and dynamics is presented together with the comparisons between measured flight data and the analytical predictions. Conclusions from these data are also presented.

N80-16092/2 PC **A11**/MF **A01**
Columbia Univ., New York. School of Engineering and Applied Science.
Research Study: Space Vehicle Control Systems.
Final Report.
P. W. Likins, and R. W. Longman. Nov 79, 247p NASA-CR-161368
Contract NAS8-32212

From the control point of view, spacecraft are classified into two main groups: those for which the

spacecraft is fully defined before the control system is designed; and those for which the control system must be specified before certain interchangeable parts of a multi-purpose spacecraft are selected for future missions. Consideration is given to both classes of problems.

N80-16093/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effects of Secondary Yield Parameter Variation on Predicted Equilibrium Potential of an Object in a Charging Environment.
C. K. Purvis. 1979, 21p NASA-TM-79299, E-117
Conf-Presented at the Ann. Conf. On Nucl. And Space Radiation Effects, Santa Cruz, Calif., 16-20 Jul. 1979; Sponsored by IEEE.

The sensitivity of predicted equilibrium potential to changes in secondary electron yield parameters was investigated using MATCHG, a simple charging code which incorporates the NASCAP material property formulations. The equilibrium potential was found to be a sensitive function of one of the two parameters specifying secondary electron yield due to proton impact and of essentially all the parameters specifying yield due to electron impact. The information on the electron generated secondary yield parameters was discovered to be obtainable from monoenergetic beam charging data if charging rates as well as equilibrium potentials are accurately recorded.

N80-16094/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Computed Voltage Distributions around Solar Electric Propulsion Spacecraft.
N. J. Stevens. 1979, 20p NASA-TM-79286, E-225
Conf-Presented at 14TH Intern. Conf. On Elec. Propulsion, Princeton, N.J., 30 Oct. - 1 Nov. 1979; Sponsored by Aiaa and Dglr.

The NASA Charging Analyzer Program is used to conduct preliminary computations of the voltage distributions around such large spacecraft in geomagnetic substorm environments at geosynchronous altitudes. Both a standard operating voltage (+ or - 150 volts on solar arrays) and direct-drive (+1200 volts on arrays) configurations are considered. Thruster-off simulations are computed for both operating voltage configurations while the effect of simulated thruster-on conditions are evaluated only for direct-drive configuration. These simulated thruster-on conditions are evaluated only for direct-drive configuration. These simulated thruster operations appear to alleviate surface charging.

PB80-143126 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
NAVSTAR Should Improve The Effectiveness Of Military Missions - Cost Has Increased.
Report to the Congress.
15 Feb 80, 31p PSAD-80-21

The NAVSTAR Global Positioning System program, which is being developed for precise worldwide navigation and position capability, has increased in cost from about $1.7 billion to $8.6 billion. This is due largely to estimates not previously included for replenishment satellites, launches, and user equipment. Extensive testing proved that NAVSTAR may provide accurate navigation and position information. However, its potential problems relating primarily to Soviet threat, satellite reliability, and launch capability could have serious cost, schedule, or performance implications.

22C. Spacecraft Trajectories and Reentry

AD-A079 683/9 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Application and Comparison of Stable Periodic Orbits in the Vicinity of Lagrangian Points L4 and L5 to a Four-Body Truth Model.
Master's thesis,
William D. Beekman. Dec 79, 127p Rept no. AFIT/GA/AA/79D-2

All previously discovered stable periodic orbits about the triangular libration points are tested on a planar restricted four-body truth model. The truth model is an algorithm developed from equations used by T.A. Heppenheimer for colony location used perturbation theory and the equation of the center. Only one of the orbits, developed by Wheeler using a very restricted four-body problem with Sun - Moon - Earth circular motion, is found to be relatively stable for at least twenty years. It is prograde about L4 having a period in resonance with the lunar synodic month. Two other orbits, one similar to Wheeler's and one 180 degrees out of phase found by Kolenkiewicz and Carpenter are marginally stable.

AD-A079 860/3 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Stabilizing an Unstable Orbit about L3 in the Sun, Earth, Moon System Using Linear Constant Gain Feedback.
Master's thesis,
Doyne E. Smith. Dec 79, 80p Rept no. AFIT/GA/AA/79D-10

Equations of motion for a satellite in a planar, elliptic four-body system are used to generate an orbit about L3. Initial conditions and a periodic reference orbit were found using a circular four-body model. Linear constant gain feedback is used to stabilize the orbit about L3 in the planar, elliptic four-body model. The computed L3 orbit is plotted against the reference orbit to assess the effectiveness of position, velocity and position/velocity feedback compensation systems. Also computed is the integrated control gain costs for each type of feedback system used. Long term stable motion near libration point L3 was achieved using position/velocity feedback compensation. Position and velocity feedback when used separately were ineffective as stabilizing feedback compensation systems. The integrated control gain costs also indicate that linear constant gain feedback is not an economical method to stabilize this periodic orbit about L3. (Author)

AD-A079 881/9 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Determination of the Minimum Delta V Transfer Trajectory from a Low Earth Orbit to a Stable Orbit Around the Lagrangian Point L4 in a Restricted Four-Body System.
Master's thesis,
Theron E. Weimer. Dec 79, 114p Rept no. AFIT/GA-AA/79D-11

In this report, the equations of motion for a satellite in restricted four-body motion are derived and examined. An algorithm is developed that produces a minimum delta v transfer trajectory from a low Earth orbit to establishment in Wheeler's stable periodic orbit around L4. Both a Hohmann transfer and an infinite velocity, straight-line transfer are examined as initial conditions for integration of the equations of motion. Transfer trajectories are determined to ten points around Wheeler's orbit so that a minimum delta v trajectory can be determined. Two types of minimum delta v values were found. One type is a true minimum value, the other type is a limiting value beyond which the target orbit can not be reached. Results are presented on a transfer trajectory that gives a minimum delta v from the points examined. From these results a more accurate transfer location is estimated. (Author)

AD-A079 903/1 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Orbital Estimation Using Two-Body Classical Orbital Elements as Measurement Updates.
Master's thesis,
Daryl G. Boden. Dec 79, 124p Rept no. AFIT/GA/AA/79D-3

Currently, the Space Defense Center (SDC) uses the position and velocity data of a satellite track to update the orbital elements of the satellite. An alternate approach would be to process the radar data at the tracking site and transmit two-body orbital elements to SDC as measurement updates. This would significantly reduce the data load at SDC. The truth model used in this study to evaluate performance and provide measurement updates to the filters includes the first four zonal harmonics and the first sectoral harmonic of the geopotential and the air drag. The estimator models include two-body dynamics and J sub 2 perturbations. In addition, the derivative of the semi-major axis is used to estimate the effects due to air drag. Perfect dynamics with measurement noise are assumed for the filter models. Three filters are evaluated; Least Squares, Bayes, and Kalman. The performance of the three filters is similar. The Bayes and Kalman Filters are nearly the same and indistinguishable in this study. All three filters performed adequately with the following exceptions. The filters diverge when singularities are present in the classical orbital elements. All three filters underestimate the covariance of the estimates. Finally, the filters track noise in the estimate of the derivative of the semi-major axis, degrading the prediction capabilities of the filters. (Author)

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